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BIOMEDICAL AND BEHAVIORAL SCIENCES

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17 JUNE 1986

USSR REPORT  
LIFE SCIENCES  
BIOMEDICAL AND BEHAVIORAL SCIENCES

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## AEROSPACE MEDICINE

### AIRCRAFT LIFE-SUPPORT SYSTEMS ON VIEW

Moscow MEDITSINSKAYA GAZETA in Russian 9 Apr 86 p 4

[Article by A. Bogoraz]

[Text] At the All-Union Scientific Research and Testing Institute of Medical Technology of the USSR Ministry of Health, a discussion of an interesting problem took place in connection with the 16th Gagarin Lectures, which were dedicated to the 27th Congress of the Communist Party of the Soviet Union, with the 25th anniversary of the first manned flight in space, and with World Aviation and Astronautics Day, which are all being observed in Moscow.

At a section of meetings on "Systems of Life Support and Crew Safety of Aircraft", approximately 80 papers and reports were presented. They focused on problems of the designing of regeneration devices, life-support apparatus, aircraft temperature control systems, and equipment for medical monitoring and also measurement technology.

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POWDERY MILDEW FUNGI FOUND IN LITHUANIAN SSR IN 1983

Vilnius TRUDY AKADEMII NAUK LITOVSKOY SSR. SERIYA B in Russian Vol 1, 1985  
(manuscript received 27 Dec 83) pp 28-32

[Article by B. I. Grigalyunayte, Institute of Botany of the Lithuanian SSR Academy of Sciences]

[Text] 1. Introduction. In Lithuania in 1983 epiphytoty caused by powdery mildew fungi of the genera *Sphaerotheca* Lev., *Erysiphe* Hedw., and *Oidium* Sacc. was noted on many plants. During the second half of May fungi spread profusely on mullein (*Verbascum densiflorum*), rocket (*Hesperis matronalis*), forget-me-nots (*Myosotis arvensis*), dandelions (*Taraxacum officinale*), and clover (*Trifolium*). During the first half of June cleistothecia were formed on rye (*Secale cereale*), wheat (*Triticum aestivum*), larkspur (*Delphinium ajacis*), and gooseberry (*Ribes uva-crispa*). Some of them, such as *Erysiphe* and *Oidium*, spread until late fall, affecting ever newer plants.

Dry and warm weather with rainy periods predominated in Lithuania in the summer of 1983. The average temperature was 18.3 to 22 °C and the average relative air humidity ranged from 60 to 86%. The above-mentioned powdery mildew fungi developed more intensively after a temporary wilting of plants. Observations showed that drought, a deficit of moisture in soil and a loss of turgor by a plant weakened plants and increased their susceptibility to powdery mildew fungi.

A generalization of the results of research on the species composition of powdery mildew fungi of the genera *Sphaerotheca*, *Erysiphe*, and *Oidium*, on their morphological features and distribution and on the range of new host plants in the Lithuanian SSR was the object of this work.

2. Method. Data collected by the author of this article in the cities of Vilnius and Kedainiai, in the Botanical Garden of Vilnius State University imeni V. Kapsukas (VBS), in the Kaunas Botanical Garden of the Institute of Botany of the Lithuanian SSR Academy of Sciences (KBS), and in Lazdiškių (Lazd.) Rayon in the summer and fall of 1983 are presented.

Average data on the measurements of no less than 20 to 50 cleistothecia (cl.), asci, ascospores (sp.) and conidia (con.) were derived during microscopic investigations of the material.

Fungi were determined basically according to [1-4].

The degree of affection of single plants and in collections was determined approximately [5].

In the following list the species of the described fungi are indicated in a systematic order and host plants, in an alphabetic order. Specific locations of powdery mildew fungi and the dates of collection are indicated.

3. List of powdery mildew fungi found in the Lithuanian SSR in 1983.

1. *Sphaerotheca ferruginea* (Schlect. ex Fr.) Junell

Mycelium on stems and petals is at first cobwebby, gradually thickening up to tomentose, brown. Mycelium forms oval spots on leaves. Con. are barrel-shaped, in chains.

On *Sanquisorba minor* Scop. Con. 18-30X9-18 (25.9X13.1) microns, KBS, 23 Aug. Up to 60% of the plants, up to 3% of their leaf surface and up to 80% of the stems are affected.

2. *Erysiphe cichoracearum* DC. ex Merat.

Mycelium is profuse, well developed on the upper side of the leaves and cobwebby on the lower side. Cl. are almost spherical, brown. There are 9 to 15 elongated egg-shaped asci with a well-pronounced stalk and two ellipsoid sp. in an ascus. Con. are barrel-shaped, cylindrical and some in short chains.

On *Carduus acanthoides* L. Con. 21-33X9-15 (26.1X12.6) microns, KBS, 23 Aug. Up to 50% of the plants and up to 20% of their leaf surface are affected.

On *Dahlia pinnata* Cav. Con. 27-36X12-24 (31.1X17.0) microns, Vilnius, 6 Sep, 10 Oct, and 30 Oct. Up to 100% of the plants and up to 80% of their leaf surface are affected.

On *Phlox divaricata* L. Cl. 96-160X96-160 (128.8X116.8) microns, asci 54-69X24-36 (60.0X29.6) microns, sp. 18-24X12-15 microns, con. 21-33X12-18 (27.3X14.4) microns, Kedaynyay, 20 Jun. Up to 100% of the plants and up to 50% of their leaf surface are affected.

On *Tanacetum vulgare* L. var. *crispum* (DC.) Ledeb. Con. 24-36X12-18 (31.2X15.3) microns, Vilnius, 9 Oct. Up to 50% of the plants and up to 15% of their leaf surface are affected.

On *Tragopogon orientalis* L. Con. 27-36X12-21 (30.0X15.3) microns, VBS, 9 Aug. Up to 30% of the plants and up to 10% of their leaf surface are affected.

3. *E. communis* (Wall.) Lk.

Mycelium is well developed, covering to a greater or lesser degree plant leaves and stems on both sides. Con. are ellipsoid, single, or often in short chains.

On *Brassica napus* L. var. *esculenta* DC. Con. 27-42X12-18 (34.4X13.8) microns, KBS, 23 Aug. Up to 50% of the plants and up to 5% of their leaf surface are affected.

On *B. oleracea* L. var. *botrytis* L. Con. 24-42X12-18 (34.1X14.5) microns, Lazd., village (hereinafter, v.) of Saltininkay, 17 Sep. Up to 20% of the plants and up to 3% of their leaf surface are affected.

On *B. pekintensis* (Lour.) Rupr. Con. 24-39X12-18 (32.4X14.6) microns, KBS, 20 Aug. Up to 30% percent of the plants and up to 5-10% of their leaf surface are affected.

On *B. rapa* var. *oleifera* DC. Con. 21-42X9-18 (34.0X13.7) microns, VBS, 9 Aug. Up to 30% of the plants and up to 10% of their leaf surface are affected.

On *B. rapa* var. *oleifera* f. *annua* Metzg. Con. 27-45X12-18 (33.8X13.9) microns, VBS, 9 Aug. Up to 20% of the plants and up to 5-10% of their leaf surface are affected.

On *Vinca minor* L. Con. 24-45X12-21 (33.4X15.5) microns, Vilnyus, 1 Nov. Up to 50% of the plants and up to 20% of their leaf surface are affected.

#### 4. *E. graminis* DC. ex Merat

Mycelium is at first white on the lower and upper parts of the leaves and later, in the form of dingy-grey, brown dense cushions. Con. are in long chains and ellipsoid.

On *Agropyron pectiniforme* Roem. et Schult. Con. 18-30X9-15 (22.6X12.6) microns, KBS, 20 Jul. Plants are affected negligibly.

On *Bromus erectus* Huds. Con. 21-33X9-15 (26.8X12.5) microns, KBS, 20 Jul. Up to 20% of the plants and up to 3% of their leaf surface are affected.

On *Hordeum distichon* L. var. *nutans* Schubl. Con. 18-36X9-12 (29.4X11.7) microns, VBS, 20 Jul. Up to 80% of the plants and up to 15% of their leaf surface are affected.

On *H. jubatum* L. Con. 24-30X12-15 (27.9X12.8) microns, KBS, 24 Aug. Plants are affected negligibly.

On *H. vulgare* subsp. *hexastichon* var. *parallelum* Korn. Con. 24-33X9-15 (28.7X12.2) microns, VBS, 22 Jul. Up to 50% of the plants and up to 5% of their leaf surface are affected.

On *H. vulgare* subsp. *hexastichon* var. *pyramidalis* Korn. Con. 18-27X9-12 (22.2X10.5) microns, VBS, 9 Aug. Up to 50% of the plants and up to 5-10% of their leaf surface are affected.

On *H. vulgare tetrastichum* L. var. *trifurcatum* Schlech. Con. 18-33X9-15 (25.4X11.9) microns, VBS, 22 Jul. A total of 30% of the plants and up to 5% of their leaf surface are affected.

On *Triticum aestivum* L. var. *albidum* Al. Cl. 112-240X96-224 (168.8X152.8) microns, con. 18-33X9-15 (26.5X12.1) microns, VBS, 22 Jul. A total of 50% of the plants and up to 5% of their leaf surface are affected.

On *T. aestivum* L. var. *graecum* Korn. Con. 18-33X9-12 (27.3X11.7) microns, VBS, 22 Jul. A total of 30% of the plants and up to 3% of their leaf surface are affected.

5. *E. martii* Lev.

Mycelium is developed profusely on both sides of the leaves. Con. are single and ellipsoid.

On *Tetragonolobus purpureus* Moench. Con. 21-36X12-15 (31.6X13.7) microns, KBS, 23 Aug. A total of 100% of the plants and up to 80-90% of their leaf surface are affected.

6. *E. polygoni* DC. ex Saint-Amans

Mycelium is well developed on both sides of the leaves and on stems. Cl. are in groups, dark-brown and on both sides of the leaves. There are 3 to 10 (mostly 6) ellipsoid asci on the stalk and 3 to 5 ellipsoid sp. in an ascus. Con. are elongated-ellipsoid or almost cylindrical.

On *Beta vulgaris* var. *rubra* (L.) Moq. Cl. 96-128X80-120 (115.2X105.6) microns, asci 51-66X30-42 (60.1X35.4) microns, sp. 21-27X9-15 microns, con. 24-45X12-18 (34.2X14.7) microns, Vilnyus, under hothouse conditions. Cl. 80-160X80-160 (122.4X112.8) microns, con. 27-42X15-21 (34.9X17.4) microns, Lazd., v. of Saltininkay, 17 Sep. Up to 90% of the plants and up to 75% of their leaf surface are affected.

7. *E. ranunculi* Grev.

Mycelium is well developed on the upper part of the leaves and on stems and is cobwebby on the lower part of the leaves. Cl. are in groups on leaves and stems. There are two to nine ellipsoid asci and three to five ellipsoid sp. in an ascus. Con. are single, or in short chains, and ellipsoid.

On *Thalictrum minus* L. Cl. 80-144X80-128 (108.0X96.8) microns, asci 51-66X30-39 (57.5X34.4) microns, sp. 18-24X12-15 microns, con. 21-36X12-15 (28.7X14.0) microns, KBS, 23 Aug. A total of 80% of the plants and up to 50% of their leaf surface are affected.

8. *Oidium* sp.

Mycelium is profuse, developing on the leaf surface and on the stems of the host plant in the form of small round spots. Later the spots blend and

mycelium becomes powdery. Con. are in short chains and single, in most cases ellipsoid or cylindrical and barrel-shaped.

Table 1. Powdery Mildew Fungi and Their Host Plants Found in the Lithuanian SSR in 1983

No in order	Fungus Species	Family, Host Plant
1	<i>Sphaerotheca ferruginea</i> (Schlecht. ex Fr.) Junell	Rosaceae: <i>Sanquisorba minor</i> Scop.
2	<i>Erysiphe cichoracearum</i> DC. ex Merat	Compositae: <i>Carduus acanthoides</i> L., <i>Dahlia pinnata</i> Cav., <i>Tanacetum vulgare</i> L. var. <i>crispum</i> (DC.) Ledeb., <i>Tragopogon orientalis</i> L.
3	<i>E. communis</i> (Wall.) Lk.	Polemoniaceae: <i>Phlox divaricata</i> L. Apocynaceae: <i>Vinca minor</i> L. Cruciferae: <i>Brassica napus</i> L. var. <i>esculenta</i> DC., <i>B. oleracea</i> L. var. <i>botrytis</i> L., <i>B. pekintensis</i> (Lour.) Rupr., <i>B. rapa</i> var. <i>oleifera</i> DC., <i>B. rapa</i> var. <i>oleifera</i> f. <i>annua</i> Metzg.
4	<i>E. graminis</i> DC. ex Merat	Gramineae: <i>Agropyron pectiniforme</i> Roem. et Schult., <i>Bromus erectus</i> Huds., <i>Hordeum distichon</i> L. var. <i>nuttans</i> Schubl., <i>H. jubatum</i> L., <i>H. vulgare</i> subsp. <i>hexastichon</i> var. <i>parallelum</i> Korn., <i>H. vulgare</i> subsp. <i>hexastichon</i> var. <i>pyramidalis</i> Korn., <i>H. vulgare tetrastichum</i> L. var. <i>trifurcatum</i> Schlecht., <i>Triticum aestivum</i> L. var. <i>album</i> Al., <i>T. aestivum</i> L. var. <i>graecum</i> Korn.
5	<i>E. martii</i> Lev.	Fabaceae: <i>Tetragonolobus purpureus</i> Moench.
6	<i>E. polygoni</i> DC. ex Saint-Amans	Chenopodiaceae: <i>Beta vulgaris</i> var. <i>rubra</i> (L.) Moq.
7	<i>E. ranunculi</i> Grev.	Ranunculaceae: <i>Thalictrum minus</i> L.
8	<i>Oidium</i> sp.	Compositae: <i>Helenium hoopesii</i> A. Gray., <i>Pyrethrum roseum</i> (Adam) Bieb. Cucurbitaceae: <i>Thladiantha dubia</i> Bng. Rubiaceae: <i>Galium tinctoria</i> (L.) Scop. Saxifragaceae: <i>Philadelphus pubescens</i> Lois.

On *Galium tinctoria* (L.) Scop. Con. 21-33X12-15 (26.6X13.5) microns, KBS, 23 Aug. Up to 90% of the plants and up to 80% of their leaf surface are affected.

On *Helenium hoopesii* A. Gray. Con. 21-39X15-21 (28.1X16.9) microns, KBS, 23 Aug. Up to 20% of the plants and up to 5-10% of their leaf surface are affected.

On *Philadelphus pubescens* Lois. Con. 21-36X12-15 (27.5X14.4) microns, Vilnius, 13 Oct. Up to 10% of the plants and up to 3% of their leaf surface are affected.

On *Pyrethrum roseum* (Adam) Bieb. Con. 24-33X12-18 (27.8X15.6) microns, KBS, 23 Aug. Up to 20% of the plants and up to 30% of their leaf surface are affected.

On *Thladiantha dubia* Bng. Con. 21-42X15-18 (27.9X15.9) microns, Vilnius, microrayon Baltupay, 11 Oct. A total of 100% of the plants and up to 75% of their leaf surface are affected. (It was first found by K. Brundza in 1934). The uncovered eight species of powdery mildew fungi pertaining to three genera (*Sphaerotheca* Lev., *Erysiphe* Hedv., and *Oidium* Sacc.) parasitized on 29 new host plants of 12 families (table 1).

### Conclusions

1. As a result of an analysis of the data on the finds of powdery mildew fungi collected by the author of this article in the summer of 1983 in the cities of Vilnius and Kedainiai, in the Botanical Garden of Vilnius State University imeni V. Kapsukas, in the Kaunas Botanical Garden of the Institute of Botany of the Lithuanian SSR Academy of Sciences, and in Lazdiyskiy Rayon, eight species of powdery mildew fungi of three genera (*Sphaerotheca* Lev., *Erysiphe* Hedw., and *Oidium* Sacc.) parasitizing on 29 new host plants of 12 families were uncovered.

2. All the fungus species presented in the list were found on 12 decorative, 6 vegetable, 9 cereal, 1 fodder and 1 wild growing plants, which were first established as host plants.

3. In the Lithuanian SSR under field conditions *E. polygoni* was first found at a perfect stage on sugar beets (*Beta vulgaris* var. *rubra*) and damage to the family Apocynaceae (*Vincetoxicum* minor) by the fungus *E. communis* was also observed for the first time.

4. *E. cichoracearum*, which damaged *Dahlia pinnata* and *Phlox divaricata* for the first time in the Lithuanian SSR, *E. martii*, which damaged *Tetragonolobus purpureus*, and *Oidium* sp., which damaged up to 100% of the *Thladiantha dubia* plants, were the most harmful and widespread fungi.

5. During the relatively dry and warm year of 1983 powdery mildew fungi appeared 2 weeks earlier than during previous years.

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11439

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## NEW PLANT VARIETIES THROUGH BIOLOGICAL ENGINEERING

Moscow SELSKAYA ZHIZN in Russian 17 Nov 85 p 2

[Article by R. Bytenko, corresponding member, USSR Academy of Sciences and All-Union Research Institute of Agriculture imeni Lenin; USSR State Prize Laureate]

[Abstract] Plant cells grown in culture with selection of the proper cells and creation of the proper growing conditions can be used to produce twin plants quite identical to the initial plants from which the tissues and cells were taken; conversely, by manipulating the cells and their growing conditions, it is possible to cause a breakdown of the genetic process, obtaining new plants with altered heredity characteristics. By obtaining cells without cell walls, isolated protoplasts, the biologist can act as a biological engineer, constructing and reconstructing cells, introducing foreign heredity material or replacing their natural organs with foreign ones taken from the cells of other species of plants. The present article discusses a few features of this new cellular technology in popular terms. Recent achievements in this area have made it possible to select cells for the creation of plants resistant to various unfavorable conditions, which can serve as the basis for subsequent selection of varieties. Conditions can also be created for cell-level selection of superproducers of essential amino acids and protein. In the very near future it will be possible to transfer individual genes into plant cells and thus into the plants which they produce.

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## SIMPLE CAPILLARY MICROPRECIPITATION TEST FOR PLANT VIRUS ASSAY

Tallinn IZVESTIYA AKADEMII NAUK ESTONSKOY SSR. BIOLOGIYA in Russian  
Vol 34, No 3, 1985 (manuscript received 26 Apr 84) pp 188-191

[Article by Milvi Agur, Institute of Experimental Biology, Estonian SSR  
Academy of Sciences]

[Abstract] A microprecipitation test was devised for assay of plant viruses, based essentially on slide agglutination principles. Cell sap from *Nicotiana tabacum* infected with potato X virus (PXV) and from *Lycopersicon esculentum* infected with potato M virus (PMV) was mixed with various dilutions of lapine anti-PXV and anti-PMV antiserum, respectively, on a slide. The mixtures were immediately used to fill hematocrit tubes by capillary action, the tubes were sealed and incubated at 22-24°C for 2 h. Following centrifugation for 2 min at 1200 rpm, the height of the precipitates were read with a microcylar scale. Tabular data showed a seemingly linear progression between antiserum dilution (1:2 to 1:2048 or 1:4096) and the height of the precipitate in the capillary tubes. It is evident that this approach offers the promise of a quantitative assay of at least some plant viruses. Figures 2; references 9: 3 Russian, 6 Western.

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## GERMINATION OF HYBRID SEEDS OBTAINED BY INTRA- AND INTERSPECIES WHEAT HYBRIDIZATION

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 6, Nov-Dec 85 pp 13-15

[Article by V.I. Kovtun, candidate of agricultural sciences]

[Abstract] Studies were conducted on the germination of hybrid wheat seeds obtained by intra- and interspecies hybridization of varieties commonly cultivated in Siberia. Using maternal soft spring wheats and paternal soft spring and winter varieties, as well as hard spring varieties, demonstrated that germination was highly dependent on environmental conditions. Marked differences were observed between the rates of germination of seeds obtained from intra- and interspecies hybridization. In hybridization of soft spring wheat with hexaploid species (genome ABD) the germination rate was 1.5- to 2-fold higher than with tetraploid species (genome AB). In addition, germination was negatively affected by plant damage due to pests and diseases, low temperatures, and high humidity.

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CREATION OF DONORS OF WHEAT RESISTANCE TO BROWN RUST

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 6, Nov-Dec 85 pp 17-19

[Article by G.B. Gogun, candidate of agricultural sciences, North Caucasian Scientific Research Institute of Phytopathology]

[Abstract] Hybridization studies were conducted with geographically and ecologically distant varieties of wheat to create donors of resistance to brown rust. A total of 272 crossings were employed, with F<sub>2</sub> and F<sub>3</sub> plants evaluated for resistance over a period of 2-3 years. A series of 15 highly resistant hybrids were identified and their characteristics analyzed in tabular form, of the 35 found useful for this purpose. These hybrids show a high degree of resistance to the North Caucasus population of the brown rust agent. The seeds have been provided to breeding institutions in the Ukraine and North Caucasus.

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METHODOLOGY AND ASSESSMENT OF RESISTANCE OF RICE VARIETIES TO  
PYRICULARIOSIS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 6, Nov-Dec 85 pp 20-21

[Article by T.S. Silicheva and Ye.D. Kovalenko, All-Union Scientific Research Institute of Phytopathology]

[Abstract] A study was conducted on 656 varieties of rice from different regions of the world to identify variants with high resistance to infection by *Pyricularia oryzae*. Assessment of leaf damage led to the determination and identification of susceptible and resistant varieties. Following genotype determination, recommendations will be made for their use in breeding programs. Figures 1.

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ECONOMIC EVALUATION OF SOFT SPRING WHEAT VARIETIES

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 6, Nov-Dec 85 pp 28-30

[Article by B.S. Koshelev, A.A. Molchanov, L.I. Kosachenko and V.S. Verevkin, Siberian Scientific Research Institute of Agriculture]

[Abstract] An index method is proposed for the assessment of cost effectiveness of cultivation of soft spring wheat varieties in Western Siberia. The various indexes covering climatic conditions, soil, growth periods, grain quality, etc., are combined into a harvest index. On the bases of such data decisions are made whether a given crop should be cultivated in a given area in a given year.

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PRODUCTION OF HYBRID CORNS RESISTANT TO HELMINTHOSPORIOSIS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 1, Jan-Feb 86 pp 15-1

[Article by N.B. Navrotskaya, P.V. Inglik and B.B. Chizmar, Transcarpathian Experimental Agricultural Station]

[Abstract] In view of the problem of helminthosporiosis in corn cultivation, relatively resistant Yugoslavian varieties were employed in the creation of hybrids suitable for cultivation in Transcarpathian Ukraine. Various varieties, differing in resistance and rate of maturation were developed on the basis of crossbreeding, and are summarized in a tabular form. All of them, in addition, exhibit resistance to stem rot and smut and blister formation. Individual varieties are also early-harvesting. In 1983 the hybrids Zakarpatskiy-100TV and -101M were made available for All-Union evaluation, with additional hybrids to follow. However, in the period 1981-1984 new mosaic diseases appeared in Transcarpathian Ukraine causing premature leaf drying. In some cases the causative agents have been identified while in others the etiologic agents remain unknown, although viruses and bacteria are suspected. Further breeding studies will be conducted on the creation of hybrid corn varieties resistant to these new diseases.

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## POLUKARLIK-3 WINTER WHEAT

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 1, Jan-Feb 86 pp 27-28

[Article by N.I. Yelnikov, candidate of agricultural sciences, Ukrainian Scientific Research Institute of Plant Culture, Breeding and Genetics imeni V.Ya. Yuryev]

[Abstract] A new short-stem winter wheat variety, Polukarlik-3 (semidwarf-3) was obtained by crossing (Karlik-1 x Mironovskaya-808) x Kharkovskaya-63-1, and has been tested in field trials on irrigated and unirrigated lands in the Donetsk Oblast, Cherkassy Oblast and the Kharkov Oblast in 1985 and 1986. Technical details are presented on cultivation conditions, with recommendations for planting and harvesting technology. Maximal yields to date have been on the order of ca. 900 centners/ha under optimal conditions, with a low of 46.1 centners/ha under extremely dry conditions. Polukarlik-3 is resistant to powdery moldew and brown stem rust, and moderately resistant to smut. Its short stem length (70-85 cm) makes it relatively resistant to lodging, and the variety is regarded as being moderately fast maturing. The protein concentration of the grain is within the 11-14% range, it has a gluten concentration of 24-32%, and has been rated at 3.4-4.8 relative units in terms of baking characteristics.

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## INTRA-STRAIN VARIABILITY AND ITS USE IN INITIAL SEED GROWING OF RICE

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 1, Jan-Feb 86 pp 37-40

[Article by G.L. Zelenskiy, head, Starting Material Laboratory, Breeding Department, All-Union Scientific Research Institute of Rice]

[Abstract] Recent years have seen the development of short-stemmed, fast-growing rice varieties that are resistant to lodging and very responsive to high nitrogen fertilization. In order to further define the conditions for seed growing, an analysis was conducted on intrain variability of the hybrids Spalchik, Krasnodarskiy-424, Donskoy-263 and the lineal varieties Solnechnyy and Kuban-3 under various conditions. During the first year N<sub>120</sub> or N<sub>240</sub> was used in conjunction with P<sub>90</sub>K<sub>60</sub> for fertilization, and in the second and third year N<sub>150</sub>P<sub>90</sub>K<sub>60</sub>. Analysis of the various productivity factors (panicle length, weight of 1000 seeds, straw yield, panicle density, etc.), and correlation analysis of the values for the different years, showed both persistent similarities and dissimilarities, the latter indicative of intrain variability. Tabular data are provided for the classification

of the various traits on the basis of variability, e.g., high, low, moderate, and the use that such information has in the breeding of new hybrids is discussed. Notice is given that variability is predicated on both the genotype and the conditions of cultivation, and that both factors have to be taken into consideration in the evaluation of rice varieties. Figures 1.

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PLANTING TIME, HARVEST AND GRAIN QUALITY OF SPRING WHEAT DIFFERING IN RATE OF MATURATION

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 1, Jan-Feb 86 pp 49-50

[Article by D.I. Tkalenko, chief, Seed Technology Laboratory, Krasnoyarsk Scientific Research Institute of Agriculture, and V.P. Vorontsova and L.I. Valiulina, candidates of agricultural sciences]

[Abstract] Studies were conducted in the Krasnoyarsk region on the relationship of planting time and environmental conditions on the seed quality and harvests of moderately-rapidly maturing spring wheats Skala and Irtyshanka-10. Tabular summaries are provided for the harvests and seed quality for the years 1981, 1982 and 1983. On the basis of the tabulated data, it is evident that, in years with low precipitation, the optimal planting time for the spring wheat was the last 5-day period in May, whereas with normal precipitation the optimal time was the middle of May. In wet years with unfavorable temperatures, grain quality deteriorated progressively with delay in sowing time. In dry years high quality grain was obtained regardless of the planting time. Appropriate recommendations were formulated for the cultivation of these varieties in Krasnoyarsk region on the basis of these findings.

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NEW RICE VARIETY LIMAN

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 1, Jan-Feb 86 p 55

[Article by V.N. Shilovskiy, G.A. Singildin and V.A. Dzyuba]

[Abstract] A new variety of rice, designated Liman, was obtained by crossing Baldo, Anao and Cha-shi-1 varieties and, beginning with 1986, has

been cultivated in Krasnodar Kray as a replacement for Kuban-3 rice. The new variety has a relatively fast growth rate with new shoots appearing in 3 days, reaching a plant height eventually of 90 cm (ca. 20 cm less than Kuban-3). It is more resistant to lodging than Kuban-3, and less susceptible to pyriculariosis. Under various conditions of cultivation the yields have fallen in the range of 60-90 centners/ha.

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UDC 633.853.52:631.526.32

#### SOYBEAN VARIETY VNIIS-1

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 1, Jan-Feb 86 pp 55-56

[Article by T.P. Ryazantseva, honored agronomist, RSFSR, and L.K. Malysh, candidate of biological sciences, All-Russian Scientific Research Institute of Soybeans]

[Abstract] Soybean variety VNIIS-1 has been cultivated in the Amur Oblast since 1979, and in Saratov Oblast since 1981, with yields under optimal conditions approaching 32 centners/ha. VNIIS-1 was derived by crossing the geographically distant VNIIMK-8012 and Yubileynaya varieties. In terms of absolute dry weight, seed analysis has yielded the following figures: 20.7% lipids, 40.9% protein, and 3 mg% tocopherols. The protein component contains 57.0-68.7% fraction 11S and 1.05% methionine. Prior to planting, the seeds should be treated with sodium molybdate (or ammonium molybdate), while pretreatment with nitragin [sic] is obligatory on fields newly planted with soybeans.

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MORPHOPHYSIOLOGICAL INDICATORS OF PRODUCTIVITY AND AGROPHYTOCENOTIC  
CHARACTERISTICS OF HIGH-YIELD WINTER WHEAT IN MIDALPINE AREAS

Moscow SELSKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 12, Dec 85  
(manuscript received 18 Apr 85) pp 3-9

[Article by R.A. Urazaliyev, V.P. Bedenko and A.M. Musabayev, Institute of Botany, Kazakh SSR Academy of Sciences, Alma-Ata; Kazakh Scientific Research Institute of Agriculture imeni V.R. Williams, Almalybak, Alma-Ata Oblast]

[Abstract] An assessment was conducted on the morphophysiological indicators of photosynthetic activity and growth processes of several varieties of winter wheat cultivated in Kazakhstan under pre- (730 m) and midalpine (1700 m) conditions. The studies were conducted with intensive-type varieties ascribed to three types of agrophytocenotic systems: 1) Alma-Ata semidwarf and Erythrospermum-8066 varieties--Southern Kazakhstan irrigated; 2) Dnepr-21 and Bezostaya-1--unirrigated; and 3) Alma-Ata-31--alpine. Cultivated in the midalpine region under favorable climatic conditions the harvests ranged from 80.5 to ca. 103 centners/ha, and from 45.0 to ca. 57 centners/ha in the prealpine region. Under drought conditions the yields were generally higher in the prealpine area. Alma Ata-31 and semidwarf varieties and Dnepr-21 were the most productive varieties under favorable conditions. Their high productivity was correlated with very high leaf surface area (ca.  $(47-67) \times 10^3 \text{ m}^2/\text{ha}$ ), total biomass (200-250 centners/ha), high photosynthetic potential of leaves and entire plants (ca.  $(2-5) \times 10^6 \text{ m}^2/\text{day/ha}$ ), and a number of morphological features. These observations indicate the feasibility of high yields from these winter wheat varieties in midalpine regions and suggest some of the traits that may be useful as indicators of productivity for breeding purposes. References 13: 12 Russian, 1 Western.

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RESPONSIVENESS OF WINTER WHEAT SHOOTS TO TEMPERATURE SHIFTS IN RELATION  
TO PLANT PRODUCTIVITY

Moscow SELSKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 12, Dec 85  
(manuscript received 2 Jul 85) pp 10-12

[Article by V.I. Babenko and A.I. Slepchenko, All-Union Breeding and Genetics Institute, Odessa]

[Abstract] Some 14 varieties of winter wheat were evaluated in terms of dry substance concentration of shoots in response to sharp temperature shifts

simulating situations that may be encountered in the Odessa Oblast. For the first 15 days the shoots were grown on a water-sand mixture at 18-20°C, followed by 15 days at 1-2°C. At 18-20°C there were no significant differences in dry substance concentration between the shoots of high, moderate or low productivity varieties. However, after a shift to temperatures of 1-2°C the shoots of the more productive varieties contained higher concentrations of dry substance than did the shoots of low productivity varieties. The data were interpreted to indicate greater adaptive plasticity of the more productive varieties to changes in climatic conditions which, constitutes the basis for their higher yields of grain. These observations also indicate that determination of the dry substance content of shoots challenged with a sharp drop in temperature may be a useful indicator for breeding purposes. References 7 (Russian).

12172/9835  
CSO: 1840/1107

UDC 633.11:581.14

ALPHA-AMYLASE ACTIVITY OF GERMINATING SEEDS OF CEREAL CROPS DIFFERING IN FROST-RESISTANCE

Moscow SELSKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 12, Dec 85  
(manuscript received 12 Dec 84) pp 18-22

[Article by K.V. Moraru and M.V. Atimoshoaye, Institute of Plant Physiology and Biochemistry, Moldavian SSR Academy of Sciences, Kishinev]

[Abstract] A study was conducted of the alpha-amylase (AA) activities of germinating seeds of winter rye and wheat varieties differing in frost-resistance, in order to determine whether such activity can serve as an indicator of frost-resistance. Under controlled temperature conditions the AA activities at 22-24°C were correlated with survival rates of the plants at -18, -20, -22, -24 and -26°C. The tabulated results demonstrated that high AA activity of the germinating seeds of a given variety was directly correlated with its survival rate at low temperatures. It was further noted that such activity was unrelated to the isozyme pattern of AA in a given variety of rye or wheat, with total activity being dependent on gibberellin concentration in the endosperm. In addition, a further point of difference between the frost-resistant and nonresistant varieties was the much more rapid drop in AA activity at subzero temperatures of the resistant varieties. It appears, then, that AA activity of the germinating seeds of winter rye and wheat can serve as an indicator of frost-hardiness. Figures 2; references 13: 12 Russian, 1 Western.

12172/9835  
CSO: 1840/1107

## HIGH-LYSINE CORN HYBRIDS: IMPROVEMENTS IN PRODUCTIVITY, AGRONOMIC AND TECHNICAL QUALITIES

Moscow SELSKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 12, Dec 85  
(manuscript received 27 Jun 85) pp 23-27

[Article by A.A. Belousov, All-Union Breeding and Genetics Institute, Odessa]

[Abstract] Breeding studies were conducted among various varieties of corn designed to obtain hybrids with opaque-2 mutations (assuring endosperm with high lysine concentrations), yet yielding normal kernels with optimal agronomic and processing characteristics. Both Soviet and foreign corn varieties were employed as sources of genetic modifiers possessing one dominant or semidominant suppressor gene to overcome the low harvests (generally 10-15% lower) attendant to the opaque-2 gene. A series of hybrids were derived and subjected to agro-economic and biochemical analysis, with the tabulated results showing that in some cases improvements in productivity and other characteristics of the kernels were also accompanied by normalization of the endosperm. Thus, the studies demonstrated that essentially two approaches were effective in improving corn quality: the use of hybrid vigor based on population genetics, and normalization of the endosperm via use of dominant or semidominant modifier genes. Figures 1; references 17: 8 Russian, 9 Western.

12172/9835  
CSO: 1840/1107

## DIFFERENTIAL EXPRESSION OF STRUCTURAL GENES IN WHEAT VERNALIZATION

Moscow SELSKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 12, Dec 85  
(manuscript received 15 Feb 85) pp 43-47

[Article by A.P. Daskalyuk and V.P. Lobov, Institute of Plant Physiology, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Vernalization was employed to assess functional differences in winter and spring wheats in terms of structural gene expression, using hybridization techniques employing unique DNA sequences and ribosomal RNA. The hybridization studies were conducted on winter (Mironovskaya-808) and spring wheat (Mironovskaya-Spring) subjected to vernalization at 2-3°C for up to 60 days. In the case of Mironovskaya-808, 600 new types of mRNA were synthesized after 30 days of vernalization, and 2000 new mRNA types after 60 days (1300 nucleotides long) in the shoot polysomes. Analogous studies on the polysomal mRNA of Mironovskaya-Spring revealed the appearance

of 2600 new mRNA types after 30 days, and an additional 700 new types after 60 days of vernalization. These observations point to the differences that low temperatures exert on gene expression in spring and winter wheats, which occurs earlier in the spring wheat in the qualitative and quantitative sense. The functions of proteins for which these mRNA molecules are responsible are unknown as yet, but are of obvious importance. Figures 3; references 16: 4 Russian, 12 Western.

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UDC 633.11:632.9

CYTOPHOTOMETRIC STUDIES ON DNA LEVELS IN ROOT CELLS OF SMUT-COVERED WHEAT

Moscow SELSKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 12, Dec 85  
(manuscript received 19 Apr 85) pp 49-51

[Article by A.M. Yamaleyev, R.D. Valiyeva and N.B. Troshina, Biochemistry and Cytochemistry Section, Bashkir Branch, USSR Academy of Sciences, Ufa]

[Abstract] In order to resolve the controversial issue of whether infection with wheat smut affects DNA metabolism, cytophotometric studies were conducted on DNA of smut-resistant and susceptible varieties in meristematic root cells. The experimental material was obtained by treating the seed with spores, followed by germination and analysis of the seedlings. Infection with the spores was seen to be without effect in both meristematic and differentiated cells of resistant and susceptible wheats as far as ploidy was concerned. A statistically-significant increase in nuclear volume occurred in the resistant plants but not in the susceptible specimens in analysis of data for 7 and 14 day seedlings. This fact was taken as evidence of DNA activation in resistant plants as a result of host-parasite interaction. Figures 1; references 8 (Russian).

12172/9835  
CSO: 1840/1107

INHERITANCE OF FROST- AND COLD-RESISTANCE IN HYBRID WINTER WHEAT OBTAINED BY DIALLELIC CROSSINGS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 5, Sep-Oct 85 pp 11-13

[Article by Ye.T. Varenitsa, corresponding member, All-Union Agricultural Academy imeni Lenin, and S.M. Gradskov, candidate of agricultural sciences]

[Abstract] In view of the lack of winter wheat varieties possessing both high productivity and cold-resistance, intraspecies hybridization was employed in an attempt to produce such hybrids. Studies with five varieties in diallelic crossings demonstrated that highly cold-resistant varieties came from crosses using maternal Albidum-114, Ferrugineum 38, and Zarya varieties. These findings pointed to the effects of maternal cytoplasm on the cold-resistance of  $F_1$  hybrids. The fact that these varieties possess dominant genes with a positive effect on cold-resistance indicates that they can be used successfully for breeding such varieties since they yielded  $F_2$  generations with high cold-resistance.

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UDC 633.11"321":631.524.822:631.67(470.44)

PRODUCTIVE FRUTESCENCE OF SPRING WHEAT AND ITS ROLE IN PRODUCTION OF IRRIGATION-RECEPTIVE STRAINS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 5, Sep-Oct 85 pp 14-15

[Article by Yu.D. Kozlov, candidate of agricultural sciences, chief, Department of Breeding, and M.P. Mordvintsev, senior scientist, Yershov Experimental Station of Irrigated Agriculture, "Elita Povolzhya" Scientific Production Association]

[Abstract] Studies were conducted on the correlation between frutescence of spring wheat and its beneficiation by irrigation. On irrigated fields a positive intrastain correlation between frutescence and productivity ranged from  $r = 0.66$  to  $r = 0.93$ , which was significantly greater than on unirrigated fields. Evaluation of individual breeding studies of highly frutescent plants resulted in isolation of promising genotypes, some of which were transgressive, that yielded  $F_3$  generations with frutescence that exceeded that of parental varieties by 23-48%. Frutescence, therefore, deserves considerable attention as an indirect indicator of productivity in spring wheat on irrigated fields.

12172/9835  
CSO: 1840/1110

MAJOR COMPONENTS OF RICE PRODUCTIVITY

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 5, Sep-Oct 85 pp 17-19

[Article by V.S. Petibskaya, candidate of biological sciences, All-Union Scientific Research Institute of Rice]

[Abstract] Dispersion and correlation methods were employed in an analysis of some 300 morphological, physiological and biochemical traits of rice in relation to productivity. In 1982, using common rice varieties, a correlation coefficient greater than 0.5 was obtained for 86 traits, and in 1983 for 98 traits. Among traits felt to provide unequivocal indication of high productivity were such factors as high rootlet:sprout weight ratio in 10-day old shoots, maximal accumulation of mobile nitrogenous compounds during efflorescence, a prolonged period of spikelet and panicle formation, high leaf surface area, and so forth.

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CSO: 1840/1110

RESPONSE OF BARLEY TO VARIOUS FORMS OF DROUGHT

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 5, Sep-Oct 85 pp 39-40

[Article by A.M. Bykhovskiy, candidate of agricultural sciences]

[Abstract] A study was conducted on 360 Soviet and non-Soviet varieties of barley to determine their responsiveness to different drought conditions, and to identify varieties suitable for further development in water-poor areas. Beginning in 1973, the study led to the conclusion that frutescence, a key factor in productivity of a given variety, was highly water-dependent. A period of drought prior to ear formation reduced frutescence and, hence, productivity, while drought that occurred after ear formation had no effects on frutescence. In addition, four varieties of rice that were identified as being highly drought resistant (Nutans-151, Amsel, Traill, Bonanza) and productive, shall be subjected to hybridization studies and further testing.

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CSO: 1840/1110

NEW SOURCES OF DWARFNESS IN HIGH FRUTESCENCE WHEAT

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 5, Sep-Oct 85 pp 61-63

[Article by A.F. Zhogin, candidate of agricultural sciences,  
Krasnodar Scientific Research Institute of Agriculture imeni P.P. Lukyanenko]

[Abstract] Largely Western literature is reviewed on the relationship between dwarfness, frutescence and productivity of wheat, and the difficulties in producing short-stem highly productive varieties. The problem appears to lie in the insufficient translocation of metabolites from the short stem to the spikes. As a result, a search was conducted to identify genes other than those responsible for the semidwarf trait ( $Rht_1$ ,  $Rht_2$ ,  $Rht_8$ , etc.) that would allow for short stems and high productivity. Extensive studies led to the identification of grass-dwarf genes (grass-clump) for the enrichment of the genetic pool of wheat. Data available to date appears to indicate that in areas with moderate climates and in subtropics the grass-dwarf genes may be used in creating highly productive, short-stemmed wheat hybrids.

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CSO: 1840/1110

OBSERVATIONS OF TWO FORMS OF CYTOCHROME P-450 PARTICIPATING IN OXIDATION OF  
n-ALKANES WITH CANDIDA YEASTS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 6, Feb 86  
(manuscript received 22 Oct 85) pp 1509-1511

[Article by Yu.I. Sokolov, S.M. Avertisova, R.M. Davydov, Ye.R. Davidov,  
All Union Scientific Research Institute of Protein Biosynthesis;  
Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Data are reported on isolation and purification to homology of cytochrome P-450 from Candida yeasts showing that, depending on the cultivation medium, it could exist in two forms, one of which with molecular weight 51,000 participates in primary oxidation of n-alkanes and the second with molecular weight 69,000 in  $\omega$ -hydroxylation of fatty acids with less than 14 carbon atoms formed by the oxidation of the same alkanes. The content of cytochrome P-450 in the final preparation was 40%. It was shown then that two forms of this cytochrome exist in two types of Candida yeasts which differed by their molecular weight, rate constants of complex formation with CO and by the rates of hydroxylation of fatty acids. This was the first time that cytochrome P-450 with a 69K molecular weight was described. Figures 2; references 7: 1 Russian, 6 Western.

7813/9835  
CSO: 1840/426



COLD RESISTANCE OF MEMBRANES AND PROBLEMS OF PLANT CONSERVATION

Kiev KRIOBIOLOGIYA in Russian No 2, 1985 (manuscript received 18 Nov 84)  
pp 5-12

[Article by K.M. Sytnik and V.D. Manuil'skiy, Institute of Botany  
imeni N.G. Kholodnyy, Ukrainian Academy of Sciences, Kiev]

[Abstract] Data obtained by several methods are used to attempt to determine the principles of formation of cold resistance in membranes of plant cells differing in degree of hydration. The basis of cold resistance of plant membranes is found to be a decrease in functional activity and hydrophilicity and an increase in packing density of components. Earlier works indicated that membranes in the state of reduced functional activity at below-freezing temperature had lower NMR signal intensity than membranes isolated from actively vegetating tissues, possibly indicating greater bond strength between water and hydrophilic membrane compartments during forced rest periods. References 39: 15 Russian, 24 Western.

6508/9835  
CSO: 1840/321

## BIOTECHNOLOGY

### DEVELOPMENT OF BIOTECHNOLOGY

Moscow TASS in English 8 Apr 86

[Text] "According to forecasts of scientists, real results are to be ensured within the next eight-ten years in the field of biotechnology, that will make it possible to reduce considerably the impact of unfavorable environmental factors both on human beings and on farming," said Kirill Dyumayev, vice-chairman of the USSR State Committee for Science and Technology. Biotechnology has been included as one of the five priority trends in the comprehensive program for scientific-technological progress of the CMEA member-countries up to the year 2000. The main aim of that cooperation is prevention and effective treatment for serious diseases among the population, a sharp increase in food resources, a better supply of the economy with raw materials, a further development of waste-free production and a reduction of harmful effects on human beings and the environment.

/9835

CSO: 1840/1168-E

## BRIEFS

IMPROVEMENTS IN EMERGENCY FIRST AID--"Attention, resuscitation team! Emergency!..." The yellow and red vehicle races to the aid of a patient. Grabbing their portable equipment, the physicians enter the apartment. The artificial respirator is hooked up and automatic cardiac massage begins. The struggle to save the person's life continues in the resuscitation vehicle which is waiting in the driveway.... A prototype of the first domestic resuscitation vehicle is being prepared for production in Riga. Its internal equipment was developed by engineers and medics from Leningrad. The pneumatic control components were subjected to comprehensive clinical testing under the supervision of Professor F.V. Ballyuzek. Resuscitation teams working in "ambulance" substations will receive excellent equipment which will allow them to carry out resuscitation more quickly.

[By S. Krayukhin.] [Text] [Moscow NEDELYA in Russian No 6, 3-9 Feb 86 p 5]  
12793/9835

NEW SOURCE OF PROTEIN--Even the most productive fields, meadows and pastures cannot compare with the ability to "produce" a high-quality feed protein, regardless of the weather, time of day and season, utilizing a whole brigade of amazing microscopic creatures. This has been confirmed both experimentally and in practice by the research of scientists from many of the country's academic institutes. In this research, every conceivable waste product and substance, which can be obtained in the necessary quantities without particularly high expenditures, can be used as the raw material for the "biological factories" they created. Let us take by way of example a small experimental installation which recently went into operation in Vinnitsa Oblast at the Ladyshinskiy Ferment Plant. Ordinary water or, to be more precise, hydrogen obtained from it by means of electrolysis is used as the nutritive medium for bacteria which form its biotechnological base. Moreover, these microorganisms "produce" feed additives which consist of one third excellent protein. At present they are being tested at the All-Union Scientific Research Institute of the Mixed Feed Industry. Scientists also "spied" interesting properties in several varieties of yeast bacteria, they are able to produce a feed protein from cheap synthetic alcohol and even from natural gas, a component of which, of course, is methane. It was calculated that a ton of such yeasts could be substituted for an animal's food allowance of seven tons of grain. At one of the institutes microscopic algae were included in the biotechnological system, whose only "food" is ordinary light,

for which reason they are called phototrophic. This institute has developed methods for monitoring the productivity and quality of the biosynthesis of these living factories of protein, carbon, fat and physiologically active substances. Scientists are offering to make so-called purple bacteria an inexhaustible source of a variety of enzymes and vitamins, including those not produced by the body. [Text] [Moscow SELSKAYA ZHIZN in Russian 18 Feb 86 p 3] 12793/9835

CSO: 1840/432-A

## EXPLOITATION OF BIOLOGICAL SCIENCE FOR BIOLOGICAL INDUSTRY

Moscow KHIMIYA I ZHIZN in Russian No 2, Feb 86 pp 7-8

[Article by A.A. Bayev]

[Abstract] Back in 1974 decisions were made at the highest level of Soviet government to accelerate development of molecular biology and molecular genetics. The decisions were reinforced again in 1981. In the near future, new academic insitutions will be organized in the system of USSR Academy of Sciences for development of equipment, reagents and biochemical preparations. Introduction of genetic and cellular engineering, the fruits of modern biology, accelerated the transfer of the technology from laboratories to the production level, the process being known as scaling up. In the near future, domestic biology and biotechnology will contribute substantially to the acceleration of socio-economic development of the country.

7813/9835  
CSO: 1840/427

## HORMONES AND GENES: BACTERIAL SYNTHESIS OF SOMATOTROPIN

Moscow KHIMIYA I ZHIZN in Russian No 2, Feb 86 pp 9-14

[Article by V. Batrakov]

[Abstract] Under the leadership of this author, Soviet scientists are involved in preclinical evaluation of the synthetic human growth hormone (somatotropin) obtained by microbiological synthesis. In spite of its small size, the human hypothalamus produces and controls the availability of somatotropin. This hormone is species-specific and, to treat humans, it must be produced from a human source. An assumption was made that a common core fragment exists in all animal somatotropins, the rest of the molecule fulfilling some other function. Human growth hormone has 191 aminoacids and only recently it became possible to synthesize it by the so-called solid-phase procedure. However, the yield is negligible. Living cells synthesize proteins in similar fashion but without spurious errors in the sequence because of the information storage capability they

have which is located in genes. Protein biosynthesis starts with so-called transcription followed by translation. In order to make a live cell produce the protein, a gene controlling its synthesis must be introduced into its DNA. The remaining portion of this article traced the steps involved in going from a cell to a gene, from the gene to a plasmid and finally to bacteria. In summary, it was shown that biotechnology equipped with genetic engineering methods makes it possible to solve problems which less than a century ago were figments of imagination.

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CSO: 1840/427

#### PURIFICATION METHODS IN BIOTECHNOLOGY

Moscow KHIMIYA I ZHIZN in Russian No 1, Jan 86 pp 39-42

[Article by A.Ya. Teslenko]

[Abstract] Microbial synthesis is based on the following: special microorganisms grow in fermenters which produce the desired products as a component activity of their life processes. Concentrations of these end products, large volumes of the culture media must be processed; this operation can be quite expensive. One of the more important tasks in microbiological production is an effective separation of microorganism cells from culture medium. Precipitation works only with large particles; those under 1  $\mu\text{m}$  could stay indefinitely in a suspended state due to the Brownian motion energy. Microbial cells are of about such size and their separation is difficult. Most colloidal particles are charged and electric forces prevent them from coagulating into larger units the way yeasts do at the final stage of fermentation. To remove such a charge, particles could be neutralized by addition of electrolytes. But some particles resist coagulation even then because of water layers forming around them by the surface active substances. Another method is based on addition of polymers to suspensions. This helps polymer particles to adhere to various particles, sometimes even several of them forming bridged structures. Agglutination is just another adhesive process in biology resulting from the action of immunoglobulins. The flocculation method is currently used to concentrate cell suspensions, to clarify liquids, etc. Further development of biotechnology is unthinkable without the wide use of polymer sorbents, foam quenchers, flotation reagents, etc.

7813/9835

CSO: 1840/428

## PRACTICAL APPLICATION OF BIOTECHNOLOGY

Moscow TEKHNIIKA I NAUKA in Russian No 12, Dec 85 pp 1-4

[Article by M. Aprelina]

[Abstract] This article records a conversation with Academician A.A. Bayev on the essence of biotechnology. Bayev, the Director of the Institute of Biochemistry imeni A.N. Bakh, notes that Soviet microbiological industries currently produce 150 different products, including fodder protein, produced at over 1 million tons per year. Giant plants with capacities of 50 to 300,000 tons per year are in planning and in construction. Bacteria will also be called upon to absorb methane in coal mines, while bacteria which emit methane will be used to increase the pressure in oil fields to improve extraction. Every microbe cell is a tiny chemical plant which can be used to produce various products. Cellular and genetic engineering can even develop entirely new bacterial species for the production processes of tomorrow. Continued progress in genetic engineering of higher organisms will not be possible without the development of cellular biology, molecular genetics, molecular biology, microbiology and biochemistry.

6508/9835

CSO: 1840/300

## BIOTECHNOLOGY AND POWER ENGINEERING

Moscow TEKHNIIKA I NAUKA in Russian No 12, Dec 85 pp 4-5

[Article by I. Berezin, corresponding member, USSR Academy of Sciences, director, Institute of Biochemistry imeni A.N. Bakh, USSR Academy of Sciences]

[Abstract] Engineering enzymology is a branch of science and technology which utilizes enzymes as catalysts for chemical processes. The use of thermophilic microorganisms is very promising. Large-scale processing of agricultural wastes and garbage to yield methane may provide an alternate source of fuel as fossil fuel sources are exhausted. "Power farms," large greenhouses made of plastic to retain carbon dioxide, will produce high protein plants for nutrition and wastes for processing to yield fuel.

6508/9835

CSO: 1840/300

## HIGH ENERGY BACTERIA

Moscow TEKHNIIKA I NAUKA in Russian No 12, Dec 85 pp 5-7

[Article by M. Orlova, Special Correspondent]

[Abstract] The author describes a visit to Moscow State University where she saw a solar-powered biosystem converting light energy to chemical energy by means of photosynthesis in flasks utilizing two cultures of microorganisms. These cultures were of microscopic blue-green algae producing carbohydrates by photosynthesis, and thermophilic anaerobic bacteria in a second flask, which consume the carbon compounds and liberate carbon dioxide and hydrogen. The hydrogen produced in the system is considered to be a most promising synthetic fuel. This biophotolysis system can in effect "store sunlight," converting the energy in sunlight to hydrogen. A view of a future bio-electric power system is sketched, in which the same reaction would be performed on a large scale to yield hydrogen for a municipal power system.

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CSO: 1840/300

## COURSE INTO THE FUTURE

Moscow OGONEK in Russian No 7, Feb 86 pp 4-5

[Article by G.K. Skryabin, Hero of Socialist Labor, First Scientific Secretary, Presidium, USSR Academy of Sciences, and P. Markov, Lawyer]

[Abstract] This article, part of a series discussing party Congress documents, touches upon problems relating to fundamental research in biology. The CC CPSU and Council of Ministers have issued documents concerning future development of biology and biotechnology in response to fundamental changes in biotechnology, such as the development of the world's first large-scale production facilities for nutrient yeasts, which are cultivated in petroleum hydrocarbons, utilizing normal paraffins previously considered wastes. The Academy of Sciences has organized an interdepartmental scientific and technical complex called "Biogen," which includes research institutes, design offices and production facilities. The new complex is to cooperate actively in the further development of biotechnology and gene engineering.

6508/9835  
CSO: 1840/351



## MEMBRANE PROCESSES, THE FUTURE OF BIOTECHNOLOGY

Moscow NTR: PROBLEMY I RESHENIYA in Russian No 2, 21 Jan-3 Feb 86

[Article by S. Navashin, academician, USSR Academy of Medical Sciences, director, All-Union Scientific Research Institute of Antibiotics]

[Abstract] Membrane processes are attractive for many reasons: they can occur at any temperature, avoiding heat damage to unstable molecules; they yield highly purified products with low content of even such impurities as enzymes; membrane technology is simple to automate and computerize; and the production of antibiotics and other medications by membrane methods allows broad variation of the scale of production by temporary connection or disconnection of standard membrane technology modules, making production processes more flexible. The transition to such processes, using natural living cell membranes, is an example of a combined approach to technical rearmament of biotechnology processes called for by the CC CPSU. The Ministry of the Chemical Industry, however seems to be lagging in interest in the development of membrane technology. It is important that this be corrected, since all medicines and many food products can be obtained by membrane processes.

6508/9835

CSO: 1840/352

## ENVIRONMENT

### SEA BOTTOM HABITAT

Moscow IZVESTIYA 2 Apr 86 p 6

[Article by V. Korneyev]

[Excerpt] Preparations for an unusual experiment--creating an underwater environment for human habitation in line with 'blueprints' of living nature--are under way at the Central Scientific Research and Experimental-Design Laboratory of Architectural Bionics of the State Civil Construction Office's Central Scientific Research Institute of the Theory and History of Architecture.

Ascertaining the structural principle of one or another organism, instead of obtaining a master copy of the organism for 'duplicating' purposes, is of primary importance to scientists and specialists here. This has already led specifically to the development of transformable structures, in which colleagues from Leningrad Kiev and Tbilisi took part. The idea for these structures was suggested by flower petals that unfold, and plant leaves that fold up. Such structures are now being serially produced at a number of factories; hundreds of working drawings have been distributed by the laboratory. When brought to a construction project in compact packages, such 'collapsible structures' are easily transformed into dwellings for geologists, hot-houses, warehouses or summer structures. There are numerous variants of them.

"In the bionic conception of architecture, the main role has begun to be assigned more to the building of live tissues, with consideration for their characteristic exchange processes, rather than to support elements such as trunks or stems", said Candidate of Architecture Yu. Lebedev, head of the laboratory.

"Take prospecting and mining of mineral resources on the coastal shelf of the ocean, for example. How do people now work there? They drill from the surface of the water. The maintenance system for such drilling is very complex, particularly at great depths. We have the task of developing an underwater environment in which people could do work with these drilling rigs, including repair work, in the depths of the ocean. This is called for by an industry program for the application of architectural bionics in extreme conditions of construction, and by a scientific program of member-countries

of the Council for Mutual Economic Aid. We have given this program the title 'Okean'."

"What connection does this have with the structure of tissues of living organisms?"

"The most direct kind! Before such a complex task is undertaken, studies must be made of the hydrodynamic properties of specific organisms and of their adaptability to a water environment. In collaboration with scientists of the Ukrainian Academy of Sciences' Institute of Zoology, we selected several types of marine animals: tuna, certain cetaceans, sea urchins and a number of mollusks. Their bionic properties are now being analyzed in the laboratory.

"The task of creating an underwater environment in which human beings could work as they do in space, for example, still seems fantastic. But experience indicates that it is quite possible to accomplish. There are problems enough, to be sure. A structure (precisely a 'collapsible' one) must first be lowered into the water and then transformed, automatically, into an underwater dwelling. A communication link between the architectural environment formed on the seabed and the sea's surface (i.e., special platforms on the surface) is also necessary. It might be said that these features have now been mastered from the theoretical standpoint and partly from the design standpoint in our laboratory. The problem of the underwater dwelling's covering remains the one that is hardest to solve, of course."

"From the bionic standpoint?"

"Yes. Take the skin tissues of plants and animals, for example. Fish live in the water without becoming soaked through, due to the effect of the layered structure of their skin tissues. They are in fact a semipermeable system. Specialists know that semipermeable films pass oxygen while holding back water.

"Such a 'gill'-type film would permit the creation, for example, of a large (about 100-200 meters) closed space--a kind of bubble, which would be supported by a transformable, 'collapsible' structure. In the process, limits would have to be defined for the pressure of the water layer and for normal atmospheric pressure in the environment inhabited by humans, for example."

"And how to ensure the safety of such habitation?"

"It is to be ensured by the porosity of the film; cellular structures are quite strong. We are planning field tests next year in which architectural systems will be folded up and unfolded while moving under water. And at some time toward the end of the 5-year plan, it appears, we shall produce a small dwelling that can be lowered onto the coastal shelf.

"Our dwelling's covering itself must take the place of all ventilating equipment, ensuring gas and moisture exchange automatically. We have to create a large stationary space under water, in which people can work freely."

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CSO: 1840/1171-E

UNIFICATION OF THRESHOLD LIMIT VALUES AND SAMPLING OF AIR AND  
BIOLOGICAL MATERIALS AT WORKING SITES

Prague JOURNAL OF HYGIENE, EPIDEMIOLOGY AND IMMUNOBIOLOGY in English  
Vol 29, No 1, 1985 (manuscript received 5 Oct 83) pp 23-27

[Article by D. Liska, Center of Occupational Medicine, Research Institute  
of Preventive Medicine, Bratislava, Czechoslovakia]

[Abstract] A brief discussion is presented of the factors to be considered in air sampling at work sites, including the types of processes involved, raw materials and finished products, layout, and areas of human exposure. Consideration is also given to biological materials that should be selected for monitoring, such as blood, urine, hair, etc., to assess the impact of chemicals and physical factors. In the determination of threshold limit values, time factors have to be accorded careful consideration as well as the analytical technology. In the final analysis, a reconciliation has to be effected between the standards employed in the different countries of the COMECON (CEMA) which are based on local conditions, and those that would be applicable on an international scale. References 3: 1 Czech, 1 Slovak, 1 Soviet (in English).

12172/9835  
CSO: 1840/1115-E

## EPIDEMIOLOGY

### FOOD POISONING IN UZBEKISTAN

Tashkent YOSH LENINCHI in Uzbek 17 Jan 86 p 4 500 words

[Article by A. Ergashev (physician of the Republic House of Sanitary Education): "Be Clean and Careful"]

[Excerpt] One of the events which sometimes destroys our health is a botulism outbreak. Botulism is a serious type of food poisoning caused by the botulinus bacillus microbes found outside in layers of the soil. Canned goods produced in an unsanitary way are an important condition for the development of the botulinus bacillus. Although there have not been many cases, the causes for the cases of botulism in our republic in recent years have been canned fruit and fruit pastes. As a result of improper canning technology by some people who prepare canned goods at home, the botulinus bacillus microbes which come from the soil through the vegetables and fruits make the canned goods unfit for use. Likewise, not knowing how to store goods canned at home and careless use of them causes serious consequences.

Sometimes in preparing dishes a lot is made and without taking appropriate care, the leftovers are consumed the next day. As a result the food goes bad, and its spoilage and the growth in it of salmonella, staphylococci microbes, and E. coli cause food poisoning.

Great feasts are another beautiful custom characteristic of our people. Today, in particular in the villages, there are many celebrations. Of course various dishes are prepared in great quantities for those ceremonies. If meat and such dishes which spoil quickly are not prepared carefully with rules of hygiene observed, or if food is kept for a long time, it can certainly cause unfortunate results.

It is also appropriate to note that meat dishes spoil quickly in warm conditions. Although it is winter now, today's weather and warm rooms can cause food to spoil quickly. Thus there arises the danger of food poisoning.

It is possible to prevent food poisoning. Thus, it is appropriate to observe the following measures:

Do not use homemade canned goods and pastes which have changed in smell or color.

Always observe cleanliness in preparing dishes.

Always use good-quality meats and vegetables for preparing dishes; never use old or rotten ones.

Do not wait too long to consume dishes which have been prepared with meat.

It is necessary to store food and products which spoil quickly in special dishes in cold places and refrigerators.

Prevention of food poisoning is also connected to the cleanliness of the person who prepares the food. That is, the cook

must always wear clean clothes;

must not have sores on his hands;

must wash his hands with soap before preparing food.

Always keeping the dishes for preparing food clean and using different knives and cutting boards for raw and cooked meat and vegetables play an important role in preventing such unfortunate happenings as food poisoning.

/9835

CSO: 1840/1173-E

WARNING BY UZBEK PHYSICIANS ON DANGERS OF FOOD POISONING

Tashkent OQITUVCHILAR GAZETASI in Uzbek 26 Mar 86 p 4

[Article by M. Ortiqov]

[Abstract] Source newspaper carries on p 4 a 400 word article by M. Ortiqov (Head doctor of the Republic House of Sanitary Education) titled "Be Careful." The article tells of the dangers of food poisoning, especially dysentery and botulism. Ortiqov stresses that such sicknesses are a result of improperly prepared or stored food. He stresses that food left over from big celebrations, especially meat, must be kept in appropriate conditions. Moreover, he says that canned fruits and vegetables also are important sources of food poisoning.

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CSO: 1840/1173-E

UDC 616.61-002.151-07:93

HEMORRHAGIC FEVER WITH RENAL SYNDROME

Moscow KLINICHESKAYA MEDITSINA in Russian No 6, Jun 85  
(manuscript received 28 Sep 84) pp 34-41

[Article by B.Z. Sirotin, Department of Experimental Therapy, Khabarovsk Medical Institute]

[Abstract] Early information on hemorrhagic fever with renal syndrome (HFRS) appeared at the Far-Eastern (now Khabarovsk) Medical Institute as early as 1935; since then cases of the syndrome have spread to Manchuria, Scandinavia, Eastern Europe, Japan and Korea. The viral nature of the disease, which has symptoms of high fever and chills, vomiting, pain in the small of the back, and urinary changes, was identified in 1940. Transmission can be by contact, aspiration or digestion, with high periods of infection in the spring and fall. Chiefly, men employed in active outside occupations are affected. Further details of the clinical course of the syndrome are summarized. A neuroendocrine aspect of the



syndrome has also been observed in severe cases. Treatment has been aimed chiefly at reducing the severity of the symptoms, which may extend over 3-4 weeks of bed rest in severe cases. Diet with consideration of kidney factors, administration of aminase or "pipolfen", and "promedol" for pain is recommended. Aqueous electrolyte and acidity balance must be controlled as well. Until recently, no lasting effects were noted, but some pyelonephritis and kidney dysfunction has been reported. Prevention calls for elimination of the host rodent population.

12131/9835  
CSO: 1840/1113

UDC 616.127-002-022:578.835.17]-055.5/.7-07

PROLONGED PERSISTENCE OF COXSACKIE VIRUSES IN FAMILIAL FOCUS OF PATIENTS WITH INFECTIOUS MYOCARDITIS

Moscow VOPROSY VIRUSOLOGII in Russian No 1, Jan-Feb 86 (manuscript received 9 Jan 85) pp 110-115

[Article by L.S. Lozovskaya, A.N. Zherdeva, Ye.P. Kogut and I.A. Shuvalova, Scientific Research Institute of Epidemiology and Microbiology, RSFSR Ministry of Health, Khabarovsk; Scientific Research Institute of Pediatrics, USSR Academy of Medical Sciences, Moscow]

[Abstract] Fecal, throat washings, and blood samples were monitored for up to 36 months for 16 children with Coxsackie virus myocarditis and their immediate relatives (37 persons). Eleven of the children were first diagnosed either with Coxsackie virus A13 or A18, three with mixed A13 or A18 with a Coxsackie virus B, and one child with Coxsackie virus B5. Long-term persistence of the A13 and A18 viruses was noted in the immediate families for up to 13 months in 13 cases. In nine additional families group B Coxsackie viruses were isolated (B1, B3, B5), of which B1 and B3 tended to persistence in two families. Finally, a group of 8 families presented with conjoint circulation of A13, A18, B1, B2, B3 and B5 viruses. Various forms of cardiac pathology were diagnosed in 64.9% of the relatives, indicating that persistence of cardiotropic Coxsackie viruses presents a significant risk factor for young children in such familial surroundings. Figures 3; references 14: 7 Russian, 7 Western.

12172/9835  
CSO: 1840/1133

UDC 631.53.027:633.15

ENERGY-SAVING DESICCATION OF CORN EARS

Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 5, Sep-Oct 85 pp 55-58

[Article by V.I. Aleynikov and V.I. Aniskin, candidates of technical sciences, and K.V. Losev and N.U. Suleymenov, engineers]

[Abstract] Cursory mathematical and technical details are presented on drying corn ears to minimize losses due to spoilage prior to shipping to major processing plants. The on-site facility for immediate desiccation that is recommended consists of a well-ventilated shed or some other structure, where water from the ears is removed by passing air. Such energy-efficient facilities allow the reduction of the moisture content to 20-25%, depending on air humidity. A schematic description is provided of an installation constructed at the Urupskiy State Farm in Krasnodar Kray, which resulted in high-quality corn ears in comparison with the usual crib storage with limited ventilation. Figures 4.

12172/9835

CSO: 1840/1110

## GENETICS

### HEPATITIS-B VIRUS PROTEIN PRODUCTION BY GENETIC ENGINEERING

Tallinn SOVETSKAYA ESTONIYA in Russian 21 Mar 86 p 3

[Excerpt] A harmless bacterium has been called upon to play a big role in the prevention of the dangerous disease hepatitis-B. Scientists found a way of implanting genes of this infection's causative agent into the colon bacillus. This operation has led to production of the protein from which the nucleus of the virus is formed.

A particle which is absolutely devoid of the ability to infect humans thus has begun to be produced at the Latvian Academy of Sciences' Institute of Organic Synthesis. The unconventional product is needed for medical diagnostics.

Doctor of Chemical Sciences E. Gren related the following: "The protein core of the dangerous virus is the most reliable material for immunological reactions in a test tube. It gives 100-percent assurance of detection of apparent or concealed traces of the infection. It is hardly necessary to state the importance that this kind of diagnosis has for, say, selecting donors for blood transfusions. Until now it was extremely difficult to get enough of the needed substance, because the virus had to be isolated from the tissues of diseased livers."

The problem was solved by means of genetic engineering, through successful joint work between chemists and microbiologists. The process developed by the scientists already is being introduced at the experimental plant of the Institute of Organic Synthesis. The annual volume of production of the virus protein will be measured only in grams, but this will be sufficient for all hospitals, polyclinics, blood transfusion stations and research laboratories of the country.

FTD/SNAP

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CSO: 1840/1171-E

CLONING OF cDNA GENES OF WHEAT RESERVE PROTEINS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 6, Feb 86  
(manuscript received 21 Oct 85) pp 1505-1508

[Article by O.S. Rustembekov, G.G. Krivtsov, V.I. Bashkirov,  
N.V. Milshina, M.F. Shemyakin and A.A. Sozinov, academician of UkSSR  
Academy of Sciences and All-Union Academy of Agricultural Sciences  
imeni Lenin; Institute of General Genetics imeni N.I. Vavilov, USSR  
Academy of Sciences, Moscow]

[Abstract] cDNA genes coding reserve proteins of wheat were cloned and analyzed, mRNA preparation was isolated from the endosperm of developing wheat seeds *Triticum aestivum*, brand Zorya, during the period of maximum synthesis of reserve proteins. It was shown that mRNA size programming synthesis of gliadins varied from 12S to 18S. This fraction was combined and used as a matrix for synthesis of cDNA. Analysis of nucleotide sequence showed high homology in positions 232 to 473 with published cDNA of one of the genes of wheat reserve protein. The homology area was enriched in codons CAA and CAG coding for glutamine which appears to be characteristic of wheat reserve proteins. Some differences were also observed in positions 349, 382 and 440 which indicates possibly evolutionary alterations within the gliadyl protein. Overall analysis showed that the cloned cDNA contains, most probably, 3'-terminal fragment of the structural portion of  $\gamma$ -gliadine gene. The use of cDNA pTa F4 as a probe will make it possible to clone and study the structure of natural gene  $\gamma$ -gliadin. Figures 4; references 10: 2 Russian (1 by Western authors), 8 Western (1 by Russian authors).

7813/9835  
CSO: 1840/426

## IMMUNOLOGY

### INFLUENZA VIRUS RECEPTION MECHANISM OF CELLS

Moscow MEDITSINSKAYA GAZETA in Russian 26 Mar 86 p 4

[Article by Yu. Andreotti]

[Excerpt] Although the virus which causes influenza has been known for half a century, the ways in which this virus penetrates a cell have not been clear up until now.

Original research in this field has been carried out by L.D. Bergelson, corresponding member of the USSR Academy of Sciences and head of a laboratory of the academy's Institute of Bioorganic Chemistry imeni Shemyakin, and by A.G. Burinskaya, head of a laboratory of the USSR Academy of Medical Sciences' Institute of Virology imeni Ivanovskiy. Using a virus marked with a radioactive isotope and methods of fine chemical analysis, they were able to study in detail the mechanism by which the virus invades cells.

"The structure of the influenza virus is well known to scientists," related Lev Davydovich Bergelson. "The membrane of this virus is visible in pictures made with the aid of an electron microscope. This membrane is studded with projections like thorns. There are about 600 of them. It is by means of these projections that the virus initially sticks to a cell.

"Special molecules--receptors--are on the surface of the cell. A virus connects itself to the cell with the aid of these molecules. A receptor and a thorn-like projection form a special 'lock-and-key' system. The virus can therefore penetrate only certain cells, which have suitable receptors.

"We discovered that there are at least five types of molecules to which the virus connects on the surface of a cell. From the standpoint of chemical composition, all of these molecules can be classed as gangliosides, consisting of residues of lipoid substances and sugars, including so-called neuraminic acid.

"The function of each molecule had to be clarified. First, all of the gangliosides on the surface of a cell were destroyed with enzymes. Freed of them, the cell naturally became impenetrable to the virus. A ganglioside of only one type was then 'transplanted' to the surface of the cell, and the manner in which the 'lock-and-key' system operated was checked. It was found that certain gangliosides did not interact at all with the virus, while others only formed connections with projections; only one type proved to be the 'guardian that opens the gate of the cell', i.e., it

facilitated the penetration of the infection."

The scientists studied only the initial stage of viral infection. As is known, the causative agent subsequently penetrates the cell membrane and 'undresses,' i.e., it sheds its own membrane. This mechanism has not been completely clarified as yet. Other pairs of projections presumably go into operation after the first pair has connected with receptors--after all, there are hundreds of them. As a result, the virus winds a portion of the cell membrane around itself, so to speak, and the virus' own membrane unites with it.

One more path for fighting influenza--development of medicines of a new type--has opened up as a result of the work which has been done. If a cordon made up of gangliosides is placed in the path of viruses (gangliosides can be obtained by isolating them from the brains and livers of cattle), they will block off the projections of the virus, and it will be unable to penetrate cells.

FTD/SNAP  
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CSO: 1840/1171-E

## IMMUNOLOGICAL CONTROL AND ALLERGIES

Moscow IZVESTIYA in Russian 10 Mar 86 p 6

[Excerpts from article by L. Ivchenko]

[Excerpts] At present we are investigating a very untraditional course of treatment: we are trying to develop an allergen in such a way that it does not form pathological "E" antibodies but rather normal "G" ones.

In short, we are attempting to obtain an allergy vaccine. And the first step in its creation has already been taken.

"In time, of course," says Professor R. Khaitov. "We have already tested many of our hypotheses in experiments on animals. Many allergic reactions are excellently simulated in mice and guinea pigs. For example, in mice we caused a strong allergic reaction to egg white. Then we combined the allergen with a specially synthesized polymer and injected it into the animals. We discovered that the immune system responded to such a combination by producing antibodies which block the allergies."

But why combine it with a polymer in particular? This is the whole point! Soviet scientists have discovered the main principle which will make it possible to produce a vaccine for many illnesses. A synthetic polymer in combination with an antigen (part of a microbe) intensifies the immune reaction of the body many times. This interesting and important work, which is a national priority and is being conducted by the Institute of Immunology for the Creation of Principally New Synthetic Vaccines, headed by the director of the institute, Academician R. Petrov, has already obtained two preparations, one against influenza and the other against salmonellosis. They are currently being studied in experiments on animals and are being prepared for clinical tests.

12793

CSO: 1840/430-A

## CRITICISM OF DIRECTOR'S HANDLING OF MENINGOCOCCUS VACCINE TESTING

Moscow SOVETSKAYA ROSSIYA in Russian 10 Apr 86 p 2

[Article by M. Kushtapin]

[Abstract] The article investigates irregularities in the testing of an original polycomponent meningococcus vaccine which was developed at the Central Scientific Research Institute of Vaccines and Sera imeni Mechnikov (TSNIIVS). This vaccine is intended for use against the three principal meningococcus groups (A, B and C).

It is recalled that the vaccine was developed in 1982 by Tatyana Nikolayevna Belova and D. Yefimov, senior science associates of TSNIIVS. They received a certificate of invention for the method of producing the vaccine, and the USSR State Committee on Inventions and Discoveries began patenting it abroad. The scientific council of TSNIIVS approved Belova's doctoral dissertation, which resulted from her work on the vaccine, and recommended it for defense. The vaccine passed all required laboratory tests, and the institute began its series production. But its introduction in medicine was halted when industrial series of the vaccine proved epidemiologically ineffective in tests conducted at TSNIIVS. The institute's scientific council withdrew its endorsement of Belova's dissertation, and she subsequently left the institute.

Results of the industrial tests done at the institute reportedly have been challenged by other authorities. Gross violations occurred in the course of these tests, according to Professor A. Sumarokov, chairman of the Committee on Vaccines and Sera of the USSR Ministry of Health. A letter from Belova is quoted in which she related that she and Yefimov were dismissed from the vaccine project by a decision of Boris Fedorovich Semenov, director of TSNIIVS. Their meningococcus laboratory was shut down, and further work of the vaccine testing of the industrial series were assigned to other, less competent associates of the institute. Semenov's motivations for his actions presumably were that he wished to get credit for the vaccine. When the vaccine produced by Belova's successors proved inferior, Semenov attempted to shift the blame for this to the original developers, Belova and Yefimov.

Belova received support from Petr Nikolayevich Burgasov, member of the USSR Academy of Medical Sciences, USSR deputy minister of health and



Chief State Sanitary Physician of the USSR. Burgasov produced documents indicating that Semenov bypassed both him and G. Khlyabich, head of Minzdrav's Main Administration for Production of Bacterial and Viral Preparations, in securing an order from the Committee on Vaccines and Sera which barred the vaccine from medical practice.

Semenov reportedly has been cited for irresponsibility in connection with the matter, and a new order has been issued which calls for immediate drafting of a comprehensive program for research, testing and production of the polycomponent ABC vaccine. But it is said that Semenov now is dragging his heels in carrying out this directive of his immediate superiors.

FTD/SNAP

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CSO: 1840/1170-E

UDC 616.98:578.833.27]-078.73-092.9

EXPERIMENTAL ASSESSMENT OF IMMUNE RESPONSIVENESS IN INBRED MICE LINES  
DIFFERING IN SUSCEPTIBILITY TO TICK-BORNE ENCEPHALITIS VIRUS

Moscow VOPROSY VIRUSOLOGII in Russian No 1, Jan-Feb 86  
(manuscript received 10 Nov 84) pp 107-110

[Article by G.A. Kan, M.S. Vorobyeva, T.D. Shalamberidze and V.V. Blokha,  
State Institute of Standardization and Control of Medical Biopreparations  
imeni L.A. Tarasevich, USSR Ministry of Health, Moscow]

[Abstract] An assessment was conducted on cellular immunity in protecting BALB/c and CBA mice from tick-borne encephalitis (TBE) virus, based on the natural differences in the susceptibility of these murine lines to TBE virus. Studies involving subcutaneous immunization with an inactivated TBE virus vaccine followed by intraperitoneal challenge with a virulent TBE virus demonstrated that a two-fold higher vaccine dose was required in the case of the CBA mice than in the BALB/c mice for an equivalent degree of protection, a statistically significant difference ( $P < 0.01$ ). Blast transformation studies with vaccinated and intact CBA mice employing splenocytes demonstrated that the vaccine was essentially without a telling positive effect on the outcome in either case. However, in the case of immunized BALB/c mice the blast response was significantly enhanced by the presence of low concentrations of the inactivated vaccine, but not in the case of unimmunized BALB/c mice. These observations suggest that cellular immunity in the BALB/c mice is more efficient in responding to a challenge with the TBE virus, and may underlie the difference in the susceptibility to this agent between the BALB/c and CBA mice.  
References 6: 4 Russian, 2 Western.

12172/9835

CSO: 1840/1133

## IMMUNOCHEMICAL ANALYSIS OF VARIANT TICK-BORNE ENCEPHALITIS VIRUS ADAPTED TO HYALOMMA PLUMBEUM TICKS

Moscow VOPROSY VIRUSOLOGII in Russian No 1, Jan-Feb 86  
(manuscript received 22 Mar 85) pp 92-96

[Article by T.I. Dzhivanyan, S.P. Chunikhin, V.M. Lisak, G.M. Kashtanova and M.B. Korolev, Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow]

[Abstract] A strain of tick-borne encephalitis (TBE) virus adapted to the tick *Hyalomma plumbeum* and designated TBE-718/574 was subjected to comparative immunochemical analysis vis-a-vis a standard isolate from *Ixodes persulcatus* (TBE-328). The use of antisera raised in rabbits demonstrated antigenic differences between the two strains on rocket immunoelectrophoresis, with TBE-718/574 lacking the cathodally-migrating component evident in TBE-328. In addition, the pattern of precipitation of the anodally-migrating components also differed. Ouchterlony gel diffusion studies revealed only partial identity between 328 and 718/574. Finally, antigenic differences were also evident by immunoelectron microscopy. Examination of TBE-718/574 virions showed aggregations of 5-10 virions per complex: The virions were surrounded by a halo of specific immunoglobulin representing finely dispersed molecules in the  $10 \pm 4$  nm wide band. TBE-328 also formed complexes consisting of 5-10 spherical viral particles; however, the halo was narrower and the antibodies were formed into larger, more discrete, globules with short 'threads' emanating outward. These observations demonstrate that adaptation to a new host was accompanied by marked antigenic changes in TBE. Figures 3; references 15: 10 Russian, 5 Western.

12172/9835  
CSO: 1840/1133

UDC 612.017:616.36.002

## THERMOIMMUNOREGULATION--MODULATING FACTOR OF INFECTIOUS DISEASES PATHOGENESIS

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 1, Jan 86  
(manuscript received 5 Oct 85) pp 124-127

[Article by A.F. Blyuger, T.P. Pletneva, Kh.M. Veksler, N.N. Ivanova, V.A. Valuk and R.N. Radionenko, Riga Medical Institute]

[Abstract] The relationship of a thermodependent cytotoxic reaction of autoserum antibodies against lymphocytes was studied at 37° to 4°C. Using

viral hepatitis B as an example, the way in which the virus leads to various pathogenic states was studied as a function of thermoregulation. The relationship between the dynamics of thermodependent lymphocytotoxins and the content of T-cells, T-suppressors and T-helpers was investigated using monoclonal antibodies. It was shown that the in vitro immune reaction dependence on temperature could reflect formation of in vivo immunopathology. Viral hepatitis B cases studied showed how one pathogen could cause various pathologic states depending on thermoregulation. However, this switch in thermoimmunoregulation was related to the content of viral antigens and to changes in their conformation. Change in conformation of viral antigens depended on whether they were in a free state in blood circulation or bound to HLA antigens. Data are reported showing that alpha fetoprotein was seen in different conformations on the lymphocytes of patients with two different diseases at two temperatures: 37° and 4°C. References 15: 5 Russian, 10 Western.

7813/9835  
CSO: 1840/423

UDC 616.931-022:578.833.26]-078.73

#### IMMUNOENZYME ASSAY IN DIAGNOSIS OF TICK-BORNE ENCEPHALITIS

Moscow VOPROSY VIRUSOLOGII in Russian No 1, Jan-Feb 86  
(manuscript received 10 Sep 84) pp 96-100

[Article by V.N. Bashkirtsev, A.P. Ivanov, Ye.P. Dekonenko, G.P. Pivanova, M.S. Vorobyeva and I.P. Ladyzhenskaya, Institute of Poliomyelitis and Viral Encephalitis, USSR Academy of Medical Sciences; State Scientific Research Institute of Standardization and Control of Biopreparations imeni L.A. Tarasevich, USSR Ministry of Health, Moscow]

[Abstract] A total of 204 human sera from patients with tick-borne encephalitis and convalescents were tested for the presence of specific antibodies and the viral antigen by standard serologic techniques (complement fixation, hemagglutination inhibition), and the results compared with direct and indirect immunoenzyme assays. Use of the solid-phase immunoenzyme techniques demonstrated that the indirect method was four-fold more sensitive than the direct assay, and exceeded standard serologic techniques 50- to 150-fold in sensitivity. The high sensitivity of the immunoenzyme assays makes possible differentiation among the various strains of the virus, which is not always possible with conventional serology. The immunoenzyme techniques allow ready monitoring of the success of vaccination, with the indirect method revealing the presence of antibodies after a single vaccination in 31.2% of the subjects, whereas the conventional tests were negative. References 10: 3 Russian, 7 Western.

12172/9835  
CSO: 1840/1133

## INDUSTRIAL MEDICINE

### COMPUTER CHARTS OF PSYCHOLOGICAL PROFILES AND EMPLOYEE COMPATIBILITY

Moscow TASS in English 25 Mar 86

[Text] A multipurpose computer system, developed by Moscow scientists, produces a psychological portrait of a patient together with the results of his or her medical examination. It has gone into operation at outpatient clinics and research institutes in Moscow.

After answering 300 questions put by computer, the person under examination gets the opinion of an electronic psychologist about his character, inclinations, state of health and also the degree of compatibility with colleagues and recommendations on conduct in a collective where he is employed. A felicitous microclimate in the collective is a foremost condition for developing man's capabilities for creative endeavour. To select people whose psychological qualities are compatible is a difficult task: electronics is of assistance here.

"The documents endorsed by the 27th CPSU Congress paid much attention to the development of the human factor in the system of production relations", Professor Vladimir Epshtein, doctor of engineering sciences, who took part in the development of the system, told TASS. "Our computer system will make its contribution to improving the moral climate in production", he said.

"Installed in an office, this system is convenient also for making general medical check-ups of people. Without leaving the office, an employee can now use computer tests to reveal some ailments, receive a piece of advice as to what specialists to consult and in what order".

The first results of the new system's operation at Moscow outpatient clinics showed that it dramatically cuts time needed for general medical examination and allows psychotherapists to consult more than ten patients a day.

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CSO: 1840/1172-E

## PHYSIOLOGY AND ASSEMBLY LINE WORK

Moscow NTR: PROBLEMY I RESHENIYA in Russian No 12, 5-18 Nov 85 p 7

[Article by A. Rylov, candidate of medical sciences]

[Abstract] Physiological studies of assembly line workers have been conducted using a "chromatron" at the inter-industry laboratory of Systems Physiology of Labor in cooperation with the first Moscow Medical Institute imeni I.M. Sechenov. The special apparatus records motor reactions, the electrocardiogram, respiration frequency and electromyogram of the fingers of assembly line workers. The data are processed by computer to analyze the "quanta" of motor activity. A certain risk group of workers, including many with considerable experience, manifested a mismatch between cardiac and respiratory activity and the operations being performed, indicating that the body was poorly adapted to the labor process. These persons have a higher probability of development of hypertension, nervous disorders and other diseases, requiring that they be given particular medical attention.

6508/9835

CSO: 1840/359

## ALL-UNION SCIENTIFIC RESEARCH INSTITUTE OF ENGINEERING AESTHETICS AND ERGONOMIC DESIGN OF NEW EQUIPMENT

Moscow NTR: PROBLEMY I RESHENIYA in Russian No 12, 5-18 Nov 85, p 6

[Article by V. Munipov, candidate of psychological sciences, deputy director, All-Union Scientific Research Institute of Engineering Aesthetics, State Committee of Science and Technology]

[Abstract] Proper consideration of ergonomics can increase the effectiveness of equipment by 20%, decreasing training time by 20 to 30%, and reducing accidents by a factor of two to three. Ignorance of ergonomics is said to have been a major factor in the Three-Mile Island nuclear accident. Examples are listed of areas in which the application of ergonomic design principles has greatly improved the usefulness of equipment,

including equipment for the manufacture of electronic devices, air traffic control equipment, and agricultural equipment. The time has come for the creation of a system of technical standards documents on ergonomic requirements. In addition, ergonomic considerations must be included in the evaluation of the effectiveness of equipment and technologies.

6508/9835

CSO: 1840/358

## MEDICINE

### PROBLEMS NOTED AT MEETING OF SIBERIAN DEPARTMENT OF USSR ACADEMY OF MEDICAL SCIENCES

Moscow MEDITSINSKAYA GAZETA in Russian 2 Apr 86 p 3

[Article by G. Balakhin]

[Excerpt] The General Assembly of the Siberian Department of the USSR Academy of Medical Sciences (AMN SSSR) has examined results of the department's work during the last 5-year plan, as well as tasks for the 12th Five-Year Plan in the light of decisions of the 27th Congress of the Communist Party of the Soviet Union.

During the period just past, new data were obtained in a number of basic and clinical directions of medical science at institutions of the department. Many scientific developments have found practical application in hospitals, polyclinics, and medical-and-sanitary sections of major industrial associations.

At the same time, a report by Yu.I. Borodin, member of AMN SSSR and chairman of the presidium of the academy's Siberian Department, and speeches by A.I. Potapov, RSFSR minister of health, scientists, public-health organizers and Party officials noted that a number of aspects of the department's work do not meet requirements set by the 27th Party Congress. This pertains above all to intensifying scientific research and linking science more closely to practice.

At the institutes of clinical and experimental medicine, physiology, and medical problems of the North, much research still does not culminate in specific introduction. Superficial subject matter is not decreasing, either. Relatively low standards of research into the prevention, diagnosis and treatment of the most common diseases were noted.

Institutes and sections were criticized for devoting little attention to problems of a regional character. How else can one explain, for example, the fact that not a single effective method has yet been developed for preventing and treating encephalitis, opisthorchiasis and a number of other diseases, despite the presence of numerous laboratories and specialized scientific institutions on Siberian territory? At the same time, hundreds of articles of minor importance have been written and published on these topics.

Questions of the training, recruitment and assignment of personnel remain timely. Requirements made of students entering postgraduate study have become less stringent. As a result, people who are not serious students have been discovered in the process of instruction and subsequently dropped. More than 30 such 'students' were admitted during the Five-Year Plan, 14 of whom found admission to the Institute of Medical Problems of the North.

FTD/SNAP

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CSO: 1480/1169-E



## PROBLEMS IN PRODUCTION OF ADVANCED MEDICAL EQUIPMENT AND DRUGS

Moscow MEDITSINSKAYA GAZETA in Russian 26 Feb 86 p 3

[Article by B. Petrovskiy, academician, director of USSR Academy of Medical Sciences All-Union Surgery Research Center]

[Abstract] The author discusses problems of furthering the development and mass production of Soviet drugs and medical equipment which are on a par with foreign counterparts. The output of certain types of Soviet drugs which produce strong effects is too small. Among them are drugs for direct dissolution of blood clots in heart surgery, as well as antibiotics of the cyclosporin group which are effective in preventing rejection of kidney transplants.

The author goes on to report that the stock of apparatus available to public health increased by 30-40 percent, on the average, during the most recent 5-year plans. Minor equipment accounted for the bulk of this increase, however. Although dozens and even thousands of high-grade instruments are now needed, particularly computer tomographs and other x-ray and ultrasonic equipment, instruments of this class still are being produced in small quantities. A computerized patient-monitoring system called "Simfoniya" is cited as an example. This system was developed jointly by the USSR Academy of Medical Sciences' All-Union Surgery Research Center and a group of scientists headed by Academician N. Pilyugin. One of the systems is now in operation at the center. It allows processes taking place in a patient to be monitored during and after complex operations. The author notes that a group of visiting medical scientists from the United States recently judged the "Simfoniya" to be equal in every respect to computer tomographs produced by West Germany's "Siemens" firm, and even to surpass them in certain parameters. Only a few "Simfoniya" systems are now in use, however. At the same time, the USSR is spending large sums to acquire tomographs produced by "Siemens".

This situation is contrasted with the status of hyperbaric oxygenation technology. The author notes, for example, that all of the equipment of a pressure-chamber center at the surgery research center is Soviet-made. Several ministries and agencies took part in the creation of the pressure-chamber center, which was the first of its kind in the USSR and is considered

the best in the world. Cases of gas gangrene, burns and certain heart diseases are now treated at the center, which occupies a four-story building. The author reports that more than 400 specialized pressure-chamber departments are now in operation in the USSR. Hundreds of thousands of patients have been treated in these departments, all of which are outfitted with first-class Soviet equipment.

Soviet successes in this field are attributed largely to the temporary creation of a large research-and-production association, which minimized lead time. The author notes in this connection that most scientific research institutes are small ones. Many of these institutes are narrowly specialized and have only a few scientists on their staffs. The author recommends that such organizations be transformed into affiliates of chief institutes, for the purpose of reducing duplication of research topics and scattering of resources.

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CORRELATION BETWEEN INCIDENCE OF VIRAL MENINGITIS AND COXSACKIE VIRUS B IN SEWAGE WATER

Moscow VOPROSY VIRUSOLOGII in Russian No 1, Jan-Feb 86  
(manuscript received 18 Apr 85) pp 104-107

[Article by K.I. Spynu and V.P. Vutkarev, Moldavian Scientific Research Institute of Hygiene and Epidemiology, Kishinev]

[Abstract] Monitoring studies were conducted in Kishinev for the period 1979-1983 to correlate the incidence of viral meningitis with Coxsackie virus B1 levels in sewage water, as well as with the fecal excretion rate in patients and their relatives. In 1979, the correlation coefficient for the incidence of viral encephalitis and the concentration of B1 in sewage water was 0.437, while that between the excretion rate of all enteroviruses and sewage concentration of B1 was 0.876. The correlation coefficient for the excretion of B1 and its sewage concentration was 0.635 in 1979. The correlation figures varied from year to years depending on outbreaks of viral encephalitis and immunization programs among the 2 month to 7 year olds intended to eliminate poliomyelitis. However, a clear correlation was apparent between the concentration of Coxsackie virus B and the number of patients and carriers. Since the presence of 8-10% virus carriers in the population in an interepidemic period is sufficient for the detection of the virus at water treatment plants, it can be assumed that in an epidemic situation the number of carriers exceeds 10%. Figures 1; references 8 (Russian).

12172/9835  
CSO: 1840/1133

## MILITARY MEDICINE

### PERFORMANCE OF MILITARY MEDICAL PERSONNEL CRITICIZED

Moscow KRASNAYA ZVEZDA in Russian 1 Feb 86 p 2

[Article by F. Komarov, Colonel-General of the Medical Service, Head of the Central Military Medical Administration, USSR Ministry of Defense]

[Abstract] The author gives a lengthy appraisal of measures of preventive medicine for military personnel. His observations for the most part are critical. He states:

"We will still have a good deal of work to do on improving the work of the medical service at the troop level. Today we cannot be reconciled with the fact that in some medical aid posts, examination and treatment and the organization of first aid remain at a level that is not high. Not all troop medical workers thoroughly study and analyze results of medical and sanitary work. There are cases of inattentive, and sometimes even criminally negligent, attitudes of physicians to their duties. Mistakes are committed in the rendering of medical care. Sometimes it happens that a medical aid post is equipped well, but the simplest laboratory studies are not done in it. Violations of this sort are taking place in medical aid posts of the Odessa and North Caucasus military districts. We also are not satisfied with work on preventing traumatism in the Turkestan Military District and in the Northern and Pacific fleets. It is unfortunate that in a number of districts, formalism is tolerated with respect to the organization of the medical practice of troop physicians...

"More than once in the troops I have encountered situations where the heads of the medical service of a division or a regiment essentially shun medical work, substituting administrating for it. I recall the rationalizing of one troop physician, who dreamed of working in a large military hospital: 'there they have computers, tomographs, clean white smocks..., whereas with us, we have to deal with foot corns, appendicitis, and supervise the bathing of soldiers...' As if to say, it's no wonder our skills are degraded. But I say, what professional skills can be lost when day in and day out, a military physician hones his skills and acquires professional maturity?! I am firmly convinced: each medical worker can become an excellent specialist only on the basis of solid general medical practice. And service in the troops affords broad possibilities for this."

Going on to point out that the level of health in the military depends greatly on the living conditions of troops, the author says that many shortcomings in living conditions are due to medical personnel not being active enough in supervising sanitation measures. He says the problem is compounded by some commanders, political organs and officials of rear-support services, who ignore medical workers' reports of problems that affect the health of troops. The author goes on to call for improving outpatient medical examinations of troops, which he says requires special attention on the part of commanders, and for promoting participation in physical exercise and sports, which requires special attention on the part of commanders, and for promoting participation in physical exercise and sports, which requires better facilities and a better example to be set by medical officers. He also says there needs to be better planning of servicemen's leaves spent in sanatoriums and health resorts.

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## NONIONIZING ELECTROMAGNETIC RADIATION EFFECTS

### INFLUENCE OF ELECTROMAGNETIC MILLIMETER-BAND RADIATION ON CELLS OF SALMONELLA TYPHIMURIUM

Kishinev ELEKTRONNAYA OBRABOTKA MATERIALOV in Russian No 6, Nov-Dec 85  
(manuscript received 6 Dec 83) pp 55-57

[Article by I.I. Danilenko, V.I. Mirutenko, A.V. Sopil, V.K. Kovalchuk,  
N.N. Lyakhovchuk, G.G. Popovich and V.I. Bondarenko, Kiev]

[Abstract] An analysis is presented of possible ultrastructural changes in *Salmonella typhimurium* cells after exposure to electromagnetic radiation at 8 mm wave length. Changes in peroxide oxidation intensity in lipid components were also studied. No significant changes were observed in the ultrastructure of cells after exposure to an electromagnetic field at 8 mm wave length for 5 minutes. Exposures of 30 minutes produced about 20-25% of cells with delamination of cytoplasmic membrane from the cell wall. The quantity of peroxide was also increased at this exposure. Millimeter band electromagnetic fields apparently act primarily on the membranes and their lipid components. References 18: 8 Russian, 10 Western.

6508/9835

CSO: 1840/305

### INFLUENCE OF PREPLANTING TREATMENT OF CUCUMBER SEEDS WITH MAGNETIC FIELD ON GROWTH, DEVELOPMENT AND PRODUCTIVITY

Kishinev ELEKTRONNAYA OBRABOTKA MATERIALOV in Russian No 6, Nov-Dec 85  
(manuscript received 24 Oct 83) pp 52-54

[Article by P.I. Baranskiy, N.D. Gromovaya, M.F. Dumenko, L.T. Mishchenko  
and L.T. Sulima, Kiev]

[Abstract] A study is reported of the possibility of using the aftereffect of a magnetic field on seeds in agricultural practice. Cucumber seeds were exposed to a magnetic field for 72 hours one month before planting. Another set of seeds was exposed to a magnetic field for 2-2.5 hours at 45°C. The harvest was increased by 16% by exposure to a constant magnetic field for 72 hours, 45 Oe. Both constant and variable magnetic fields had a positive influence on yield. Experiments the next year, 1982-1983,

showed a 13.7% increase in yield for 72 hours exposure to the 45 Oe magnetic field. Figures 2; references 7 (Russian).

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UDC 541.135.88

EFFECT OF CONSTANT MAGNETIC FIELD ON BACKGROUND CONDUCTIVITY AND ELECTRIC SPARK-OVER OF BILAYERED LIPID MEMBRANE

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 1, Jan 86  
(manuscript received 15 Feb 84) pp 63-69

[Article by A.N. Simonov, V.A. Livshits and A.N. Kuznetsov, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] The goal of this study was to explain the effect of a magnetic field (MF) on the background conductivity of nonmodified bilayered lipid membranes (BLM) and the parameters of their electric spark-over. In 42 out of 122 BLM studied, their conductivity changed under the influence of MF. This effect and its characteristics depended on the initial specific resistance. The magnetic effect was observed only if the membranes were in a parallel plane to MF, not in the perpendicular orientation. In respect to the electric spark-over, in the parallel orientation, MF increased the stationary current stage and decreased the stage of pre-spark-over fluctuations; in perpendicular orientation, MF shortened the stationary current stage and had no effect on the pre-spark-over fluctuations. The effect of the field increased with increased number of the dimensions of "hydrophilic" pores in the membrane. Figures 5; references 8: 4 Russian (1 by Western author), 4 Western.

7813/9835  
CSO: 1840/430B

ANALYSIS OF CERTAIN KINETIC REGULARITIES OF CULTURED CELL GROWTH.  
PART 2. EFFECT OF IONIZING RADIATION, AN ALKYLATING AGENT AND LOW  
FREQUENCY ELECTROMAGNETIC FIELD

Leningrad TSITOLOGIYA in Russian Vol 27, No 9, Sep 85  
(manuscript received 10 Nov 84) pp 1070-1075

[Article by A.N. Khokhlov, M.E. Golovina, Ye.Yu. Chirkova and T.L. Nadzharyan,  
Institute of Medical Genetics, USSR Academy of Medical Sciences, Moscow]

[Abstract] A study is made of the influence--on the growth kinetics of cultivated hamster cells--of gamma radiation, the alkylating agent thio-phosphamide and a low-frequency electromagnetic field. Gamma radiation decreased both the steepness of the growth curve and the height of the plateau on the curve. Plateau height and curve steepness were also reduced almost in direct proportion to the dose of alkylating agent used. The electromagnetic radiation also reduced somewhat the height of the growth plateau, but did not decrease the steepness of the growth curve. Low frequency electromagnetic radiation is considered a geropromoter on the basis of its reduction of the growth plateau in this experiment. Figures 5; references 17: 11 Russian, 6 Western.

6508/9835  
CSO: 1840/1060



## PHARMACOLOGY AND TOXICOLOGY

### PESTICIDE CIRCULATION IN ENVIRONMENT OF AZERBAIJAN SSR COTTON-GROWING REGIONS

Baku AZERBAYDZHANSKIY MEDITSINSKIY ZHURNAL in Azeri No 5, May 85 pp 26-32

[Article by A.S. Kurbanov, V.G. Aliyev, Ya.Sh. Rafiyev]

[Abstract] Cotton-growing regions of the Azerbaijan republic have widely utilized chloroorganic pesticides, such as hexachlorane, in the past as well as currently. These have been used to combat cotton plant diseases and to raise crop production; these pesticides, however, have been shown to contaminate the environment. The article recommends that strict handling requirements be maintained, as well as adherence to public health and safety standards in order to cut back environmental pollution and prevent contamination of workers that handle these pesticides.

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### VASOACTIVE PULMONARY PEPTIDES

Moscow KLINICHESKAYA MEDITSINA in Russian No 5, May 85  
(manuscript received 23 Oct 84) pp 59-63

[Article by V.A. Goncharova, All-Union Scientific Research Institute for Lung Research, USSR Ministry of Health, Leningrad]

[Abstract] Recently the biochemical functions of the lungs have received growing attention, partly because of the work of I.R. Vane in systematizing data on vasoactive substance inactivation in the lungs. It has been learned that the lungs inactivate acetylcholine and bradykinin, and metabolize serotonin and simple glandular excretions, along with other substances, more intensively than the liver. The present article, a review, focuses on vasoactive intestinal peptides, which have been studied by radioimmunological and immunofluorometric methods. Among the peptides studied were those named above, an amino acid residual polypeptide given the name bombesin, which was first isolated from the skin of amphibians before

discovery in mammals, and two related tetrapeptides: Ala-Glu-Ser-Flu and Val-Glu-Ser-Glu, which have eosinophilic chemical activity. Other research has shown the presence of argyrophilic fluorescent granular cells with endocrine functions, especially in the lungs of embryos and newborn infants. Ferreira and Vane found that up to 80% of the bradykinin introduced into the blood was metabolized in one passage through the lungs, and other authors have identified numerous peptides that are purified by the lungs. Angiotensin I is a common one, but bradykinin has been shown to be a better substrate for many enzymes. Discussion of varying types of cell tissue in the lungs and metabolic functions relating to them complete the article. References 53: 8 Russian, 45 Western.

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CSO: 1840/1114

UDC 616.127-002.4-092.9

MODELING DISSEMINATED MYOCARDIAL NECROSES BY ORGANOPHOSPHOROUS PESTICIDE BASUDIN

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 12, Dec 85  
(manuscript received 15 Apr 85) pp 73-75

[Article by Prof. S.K. Saidkarimov, T.R. Khalikov, V.V. Vaysbrot and B.A. Tadzhiyev, Tashkent Order of Labor's Red Banner Institute for Advanced Training of Physicians]

[Abstract] The need for creating experimental models of heart ailments that are adequate for clinical pathology has brought much study. Key factors in such modeling are coronary and metabolic origins of heart ailments, as well as electrophysiological myocardial factors. The present article reports on modeling of stress-related myocardial damage using readily available laboratory animals. In the experiment, white rats weighing 180-220 g were administered a 2% basudin solution by mouth. Results showed that in 90% of the test animals, disseminating micronecroses appeared in heart muscles. Within 3 days of administration in the subendocardial myocardium of the left ventricle and papillary muscles, significant disturbances of microcirculation were observed. The myocardial damage took more regular form within 15 days of the initial toxic exposure. The test procedure can serve as a model for acute myocardial inflammations, necroses and specific cardioscleroses. Figures 3; references 5 (Russian).

12131/9835

CSO: 1840/1104

## APPLICATIONS OF MEDICINAL PLANTS

Moscow LESNAYA PROMYSHLENNOST in Russian 21 Nov 85 p 4

[Article by Ye. Timonina]

[Abstract] In a discussion held with S.Ya. Sokolov, doctor of medical sciences, Chief of Department of Pharmacology, All-Union Scientific Research Institute of Medicinal Plants, Sokolov reported that treatment of disease with medicinal plants has a number of advantages over chemotherapy. However, patients should not constantly drink tinctures of various plants without any medical supervision. Sokolov reports a new development in phytotherapy, development of safinor, a substance which helps to avoid alcoholism. Other medicinal plants apparently aid in treatment of fatigue and hypertension.

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UDC: 591.881:577.112.6:547.96

## CYTOCHEMICAL STUDY OF INFLUENCE OF SYNTHETIC ENKEPHALIN ANALOG ON PROTEIN CONTENT AND ACTIVITY OF CERTAIN ENZYMES IN NEURONS

Leningrad TSITOLOGIYA in Russian Vol 27, No 9, Sep 85  
(manuscript received 26 Jul 84) pp 1059-1063

[Article by L.M. Gershteyn, A.V. Sergutina and R.M. Khudoyerkov, Brain Institute, All-Union Scientific Center of Mental Health, USSR Academy of Medical Sciences, Moscow]

[Abstract] A study is reported of the influence of tetrapeptide amide on a number of protein metabolism indicators in cortical-subcortical formation neurons of the motor system in order to determine the fraction of participation of various morphofunctional types of neurons in this process. The study was performed on male chinchilla rabbits and male Wistar rats decapitated after subcutaneous or intraperitoneal administration of tetrapeptide amide at 500 µg per kg body mass. The data obtained indicated that the long-term change in motor activity caused by tetrapeptide amide is determined by a specific reaction of cortical and subcortical structures of the motor system. The effect was stronger 3 days after administration than 30 minutes after administration. Tetrapeptide amide alters protein metabolism in neurons in the motor system of both rabbits and rats and affects it differently in different types of cells after 30 minutes and 3 days, causing changes in the content of protein and dimensions of the cytoplasm of the neurons in layer V in comparison with layer III after 30 minutes and significant changes in protons in the neurons of the caudate nucleus 3 days after administration, apparently reflecting their morphofunctional specifics, in that they have an inhibiting influence on the functions of the cerebral cortex and participate in the control of extrapolation behavior. References 12: 4 Russian, 8 Western.

6508/9835

CSO: 1840/1060

## PHYSIOLOGY

### PORTABLE EQUIPMENT FOR BLOOD TESTS ON ARCTIC EXPEDITIONS

Moscow MEDITSINSKAYA GAZETA in Russian 28 Feb 86 p 4

[Article by M. Malakhov]

[Excerpt] On the eve of our first day of rest, radio operators of the expedition established contact with support and escort aircraft. "Wait for an airplane at the point with these coordinates," radioed the aviators.

An IL-14 airplane went into a turn over the expedition's campsite. Minutes later, the canopies of cargo parachutes opened in the lead-grey sky. Everything needed in order to continue the hike was delivered: foodstuffs, fuel, and two packages which were especially needed by the expedition's medical group. Written in large letters on each package was "Medicine, First Drop". It was our field laboratory.

Our program of medical research calls for taking venous blood from all 11 participants of the hiking group. After the necessary equipment and reagents had been dropped from the skies, Aleksandr Rozumenko, junior science associate of the Institute of Clinical and Experimental Medicine of the USSR Academy of Sciences' Siberian Department, and I began doing this task, which was no simple one.

We laid out test tubes filled with blood on a soft sleeping bag. A. Rozumenko prepared a special field centrifuge. It is a remarkable instrument; although it weighs only about a kilogram, it accelerates to a speed of 3,000 revolutions per minute. It runs on batteries. This excellent instrument was developed at the Volgograd Medical Equipment Plant.

Aleksandr and I drew off and sealed plasma, serum and erythrocytes from the samples. The work of A. Rozumenko, a professional biochemist, was a joy to behold; everything was done quickly and efficiently. After being bundled and properly packed, the test tubes were stowed in backpacks. We are taking these biomaterials with us to the SP-27 station, from where we will deliver them, in isothermal containers, to Moscow and Novosibirsk. The expedition's medical program was drafted by the Institute of Clinical and Experimental Medicine. The greater part of the biomaterials will be sent to scientists of this institute. In addition to this, we are conducting research in line with programs of the Central Scientific Research Institute of Stomatology and the State Scientific Research Institute for Standardization and Control of Drugs.

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## FACTORS AFFECTING PSYCHOPHYSIOLOGICAL STATUS OF ARCTIC SEAMEN

Moscow GIGIYENA TRUDA I PROFESSIONALNYYE ZABOLEVANIYA in Russian No 1 Jan 86  
(manuscript received 26 Feb 85) pp 28-31

[Article by Yu. M. Stenko, S.A. Vinogradov, T.A. Filatova, Scientific Research Institute for Hygiene of Water Transport, USSR Ministry of Health, Moscow: "The Combined Effects of Climate and Ship Conditions on the Status of Psychophysiological Functions in Seamen of the Arctic Fleet"]

[Text] Maintenance of the health of seamen exposed to the combined effects of climatic and geographic factors and ship conditions on long-term cruises has taken on particular importance as a result of the intensive development of shipping on North Sea navigation routes.

Comfortable living conditions have been created for crewmembers on the modern Arctic ship, including: single cabins with their own laboratories, a gymnasium, sauna, swimming pools, etc. However, virtually all ship life support systems contain design and operating deficiencies.

The increased power to weight ratio of the ships leads to high levels of noise and vibration, exceeding health and safety standards by 5-15 dB A, particularly in the engine room and rooms directly adjacent to it. In spite of the presence of a winter air-conditioning system, which is supposed to maintain microclimate parameters at a comfortable level, low relative humidity (20-30%) is found in virtually all rooms of the ship. The extensive use of polymer materials in the finishing of ships' interiors has led to a substantial increase in electrostatic field intensity. In 89 percent of the cases the intensity of the electrostatic fields in the rooms of the ship exceeds health and safety standards, in 55 percent of the cases standards are exceeded by a factor of 2 and in 33 percent by a factor of 5. The levels of artificial light in the majority of ship rooms also violates current health and safety standards. Major flaws in the water supply and waste-water disposal systems of ships built before 1975 have manifested themselves in inadequate capacity of the deep tanks and sewage collection tanks, which may lead to a shortage of fresh water on the cruise and compel pollution of the surrounding water.

The work of the crews of ships in the Arctic fleet must be performed under complex climatic conditions. During a single cruise there may be sharp

fluctuations in meteorological conditions over a short period of time. To assess the combined effects of these factors, we used the "complex coefficient of daily weather," developed by I. M. Osokin, which includes temperature, relative humidity and rate of air flow. During the research period the value of this indicator fluctuated in the different navigational seasons from 0.79 to 10.4 on the rating scale, with temperature varying from +8 to -24°C, relative humidity from 80-90 percent and air flow rate from 3 to 33 m/c.

The goal of the psychophysiological investigation was study of the specific features of adaptation in seamen on a year long cruise to the combined effects of natural, ship-related and social psychological factors.

In the opinion of a number of authors [3, 7, 8] the success and efficiency of adaptation to conditions in the North are determined by nervous and emotional state, the states of cardiovascular and thermal regulation systems.

To study the psychological status of seamen on a cruise we used the modified MMPI multidimensional personality inventory [2]. This test makes it possible to identify instances of borderline states and prepathological personality disorders. Analysis of the data obtained showed that the averaged psychological profiles of the crewmembers studied changed little over the course of the cruise. The relationships among the corrected scales reflects a certain amount of inner tension. The high values/loadings of clinical scales 9, 4 and 6 in the profile testify to the difficulty of the processes involved in psychological adaptation. The increase of the value for profile scale 1 during winter-spring navigation points to somatization of anxiety and, evidently, reflects seasonal changes in psychological and emotional states, in agreement with data obtained by Ts. P. Korolenko [5].

In order to study the course of the processes involved in psychological adaptation in more detail, we analyzed the psychological state of the seamen as a function of their length of continuous service at sea from the time of their last shore leave. This investigation demonstrated that during a long-term cruise, the crew of a ship pass through definite stages of psychological adaptation. In the first weeks at sea we noted internal tension, confusion, emotional lability, and orienting reactions associated with the need to become acclimated to their new work group and living conditions after shore leave. Subsequently, up until the third month of the cruise, psychological and emotional state was observed to stabilize and positive psychological tendencies were noted, i.e., social activity increased, and crewmembers' control over their own behavior was high. After 90 days at sea, symptoms of psychological disadaptation appeared and increased, manifesting themselves in decreasing control over behavior, disruption of interpersonal communication, irritability, increased tendency to tire, and failure to internalize social standards. The regular, statistically significant increase of these tendencies was confirmed by the increase in the number of individuals exhibiting some degree of psychological disturbance; this number increased by more than a factor of 2 after 3 months and by a factor of more than 3 after 5 months of continuous service at sea.

The study of the functional status of the central nervous system also allowed

us to identify the phase structure of the acclimation (adaptation) processes occurring after various lengths of time at sea. Indicators of higher psychological functions recorded in the second month of continuous service at sea (highest level of short term memory retrieval, decrease in the latency for simple visual- and auditory-motor reactions, minimum measured tremors) indicate that the central nervous system is operating at an optimal level and that adaptative responses are proceeding successfully. After 3 months at sea, one begins to see signs of nervous and emotional tension and the beginning of a "break down" in adaptation, manifesting itself in a statistically significant decrease in the short term memory performance, and in phase states. With further increase in duration of the cruise (over 120 days) further worsening of parameters of higher psychological functions occurs, testifying to the cumulative growth of emotional and nervous tension and fatigue.

The study of the functional state of the cardiovascular systems of the seamen revealed that the relatively high blood pressure and pulse rate observed at the beginning of the cruise and testifying to the increased tonus of the sympathetic system, began to decrease gradually and subsequently became relatively stable (on the 30th to 60th day of the cruise), testifying to the increase in "vagal" influences. In the following period, (days 60-90) heart rate and blood pressure again increased but not to a statistically significant extent. We must also note that the levels of these indicators were higher during the winter navigation season, which, evidently, was related to the effects of low temperature on the body. The decrease in blood pressure and heart rate was more pronounced in crewmembers working in the engine and boiler section. This can be explained by their exposure to high levels of noise and vibration over long periods of time.

The responses of the mechanisms regulating cardiac activity and, indirectly, the entire organism, to the set of factors studied was researched using the method of cardiac interval cardiography, which makes possible an adequate assessment of the degree of tension in the regulatory mechanisms in response to mental and physical demands, as well as emotional stress attributable to various environmental factors [1]. Analysis of the composite parameter "tension index" (TI) in the fall-summer season for groups which had been at sea continuously for different lengths of time gave some indication of the stage of adaptive processes which had been attained: the lowest values for TI occurred in crewmembers who had been at sea for 61-90 days, testifying to the organism's having attained an optimal level of functioning after some "start-up" mobilization [strain attributable to initial readjustment??] of the regulatory mechanisms. Subsequently, when crewmembers had been at sea for 91-120 days, the value of TI increased, but without going beyond normal values. In the winter navigation season, we found that the functional status of the cardiovascular system showed a similar tendency and phase structure, but to a less pronounced extent: during the most favorable period of sailing (61-90 days), above mean-normal values persisted, reflecting a high degree of mobilization of the regulatory mechanisms of the body in the period of polar night.

As we have noted, one of the leading detrimental factors in the Arctic is chilling of the body, particularly during the winter



navigation season. Comparison of the results of our studies for the winter-summer and summer-fall navigation seasons enabled us to identify very clearly the specific characteristics of the functioning of the thermal regulation system in the Arctic.

In the summer-fall navigation season functional changes in thermal regulatory reactions (mechanisms) generally correspond to the classic phases of human acclimation to cold [4], however the intervals at which these phases begin are somewhat altered: Phase I of adaptation is completed by day 20 at sea (on land -- by day 3-7); Phase II by day 50 (on land by day 10-14); Phase III begins on day 50 (on land day 25-30). In the winter-spring navigation period, Phase I, the "orienting" phase of adaptation is complete only by day 35 in the Arctic. Elements of pathological physiological reactivity prevail in Phase II adaptation, reflected, [for example,] in a high degree of thermal asymmetry in the hands (from 1 to 1.6°C). This phase must be considered prepathological [6]. Phase II -- the "normalization" phase -- (which begins on approximately day 50 of the cruise in the summer-fall season) does not occur in the winter season at all.

The duration of contact with cold is of some significance for the activation of adaptation processes in seaman in the Arctic. Members of the engineering crew and some of the command personnel may not undergo marked changes in thermal regulatory mechanisms.

Thus, study of the functional status of seamen during a long-term Arctic cruise allowed us to establish that the adaptive processes proceed according to a definite phase structure. For the first 30 days of continuous work at sea, one notes orienting reactions, characteristic of start-up strain on the regulatory mechanisms, preceding the period when the leading functional systems have stabilized and are in an optimal state, occurring between 30 and 90 days of continuous sea service. After 3 uninterrupted months at sea, certain changes can be observed which testify to the development of disadaptive disturbances.

The nervous and emotional state of a seaman on a cruise, along with the basic parameters of the major physiological systems, may serve as an indicator of the beginning of disadaptive changes and as a criterion for limiting the length of uninterrupted time at sea. The optimum cruise schedule for crews of the transport fleet under conditions of year-round navigation should not exceed 90 days.

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APPARATUS FOR MEASURING ELECTRICAL RESISTANCE OF HUMAN SKIN

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 31, No 3, May-Jun 85  
(manuscript received 12 Dec 83) pp 366-368

[Article by N.N. Kolotilov, Yu.M. Shkrebtii, Yu.F. Bespalov and  
N.Ya. Litvinov, Kiev Institute of Physical Culture]

[Abstract] An apparatus was devised for measuring the electrical resistance of human skin for which a schematic is provided and which is essentially based on amplifier K140UD8A. The apparatus can be operated either on house current or fed by a battery (7D-0,1), and is provided with semispherical 6 mm electrodes to accommodate a solid electrolyte. Tabulated data are provided for measurements carried out on swimmers performing maneuvers of various difficulty, indicating before and after values. Figures 1; references 4 (Russian).

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EFFECTS OF HYPEROXIC HELIUM-OXYGEN GAS MIXTURES ON OXYGEN UPTAKE BY TISSUES OF ALBINO RATS

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 31, No 3, May-Jun 85  
(manuscript received 6 Dec 83) pp 346-349

[Article by A.I. Nazarenko and T.N. Govorukha, Institute of Physiology  
imeni A.A. Bogomolets, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] The effects of hyperoxic (40 and 70% O<sub>2</sub>) helium-oxygen gas mixtures on tissue respiration were studied in albino male rats using a Warburg apparatus. The Q<sub>O<sub>2</sub></sub> values of ground hepatic tissue of rats

exposed to the 40% O<sub>2</sub> mixture for 1 h were  $7.2 \pm 0.1$  with helium-oxygen (40%) mixture in the apparatus, and  $5.8 \pm 0.3$  under a nitrogen-oxygen (40%)

mixture in the apparatus, versus a  $4.4 \pm 0.2$  control value (rats under normal conditions and air in Warburg apparatus). Exposure of the rats to the 70% O<sub>2</sub> mixture for 1 h resulted in essentially equivalent Q<sub>O<sub>2</sub></sub> values

(6.8 nitrogen, 6.9 helium) for the hepatic tissue. An exposure for 1 h either to the 40 or 70% O<sub>2</sub> mixture always resulted in depression of the Q<sub>O<sub>2</sub></sub> to below control values for the lung preparation, regardless of whether a helium-oxygen or nitrogen-oxygen mixture was used in the Warburg apparatus. These observations demonstrated the variability in tissue response to hyperoxic gas mixtures in terms of oxygen uptake, and variability in the effects of the inert gas component of such mixtures on tissue respiratory activity. Studies with homogenized tissues in the Warburg apparatus suggest that the effects of helium are mediated via cell membrane permeability mechanisms. Figures 3; references 7: 5 Russian, 2 Western.

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#### ROLE OF NORADRENERGIC SYSTEM IN VERY SLOW CEREBRAL PROCESSES DURING CRANIOCEREBRAL HYPOTHERMIA

Kiev KRIOBIOLOGIYA in Russian No 2, 1985 (manuscript received 22 Oct 84)  
pp 43-47

[Article by G.A. Babiychuk, V.S. Marchenko and M.I. Shifman, Institute of Cryobiology and Cryomedicine Problems, Ukrainian SSR Academy of Sciences, Kharkov]

[Abstract] A study is reported of the effects of craniocerebral hypothermia on mechanisms of synaptic transmission in combination with studies intended to determine the universal electrophysiological correlates of the key neurochemical link in the functional system of thermoregulation of the cortex and hypothalamus in response to cooling. Rabbits and white rats with implanted thermocouples were exposed to cold in the area of the head. The results indicated that cooling the brain to 22°C is accompanied by an increase in neuron discharge frequency, while below 19°C pulse activity is suppressed. It is suggested that activation of super slow processes in the brain upon cooling serves as an additional temperature homeostasis factor. The temperature regulation mechanisms leading to a decrease in the rate of cooling of the brain are brought into play only against a background of high synchronism of super slow cortical activity developing 15 to 30 minutes after the beginning of cooling. The origin of the super slow oscillations in the second band is found to be related to neurochemical processes in the noradrenergic synaptic transmission. The increase in super slow processes indicates increased reactivity of the adrenergic functional system in response to the cooling. Figure 1; references 8 (Russian).

6508/9835

CSO: 1840/321

## MOVEMENT OF CLOSED EYES AS INDICATOR OF MENTAL EFFORT

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA. SERIYA 14. PSIKHOLOGIYA in Russian No 3, Jul-Sep 1985 (manuscript received 16 Jan 85) pp 24-31

[Article by T.M. Buyakas, candidate of psychological sciences, V.A. Mikheyev, senior engineer, and A.A. Ponomarenko, graduate, Faculty of Psychology, Moscow State University]

[Abstract] The movements of closed eyes were monitored to determine whether they reflect mental effort in subjects requested to recall a number preceding a number that had been presented once before in a series of numbers. Analysis of the results for three 20-30-year-old subjects challenged with a series of 6-8 numbers at the rate of two numbers per second indicated that macrodrifts were related to the effort of attentiveness, and return movement to termination of such effort. While initial trials were accompanied by a large number of saccadic movements and low-amplitude return movements, with repetition the drifts became larger and the number of saccades and return movements diminished. The change in eye movements which came about as a result of the development of individual tactics for arriving at correct answers (in 70% of the cases eventually) demonstrated that macrodrifts of closed eyes were related to a portion of the mental effort involved in the identification of the 'right' number. Figures 3; references 19: 5 Russian, 14 Western.

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## TEMPORAL VISUAL SUMMATION IN STIMULUS PRESENTATION DURING SACCADIC EYE MOVEMENT

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA. SERIYA 14. PSIKHOLOGIYA in Russian No 3, Jul-Sep 1985 (manuscript received 19 Dec 83) pp 32-41

[Article by B.G. Meshcheryakov, candidate of psychological sciences, junior scientist, Chair of General Psychology, Faculty of Psychology, Moscow State University]

[Abstract] Two methodologies were assessed for their utility in studying saccadic temporal summation: the threshold-duration approach and phenomenological accounts of stroboscopic movement. Analysis threshold-duration plots demonstrated that the plots obtained during saccadic movement were 2.0- to 2.3-fold higher than those obtained during fixational stimulation. This difference reflected the phenomenon of saccadic suppression. Analysis of the slope of both plots of threshold increase in brightness vs. exposure time yielded values of -0.83 and -0.86 for the fixational and saccadic conditions, representing the 'degree of temporal summation'. The other approach utilized two sequential visual stimuli that were identical, but, because of eye movement in the interval between exposures, the resultant images were shifted with respect to one another in the retinal coordinates (phasic retinal shift). The latter created the

impression of movement. Since this impression results from temporal visual summation, it can be employed as a phenomenological indicator of such summation. Figures 1; references 14: 6 Russian, 8 Western.

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#### MENTAL TASK EFFECTS ON STIMULI DIFFERENTIATION

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 6, No 5, Sep-Oct 85  
(manuscript received 20 Sep 83) pp 131-133

[Article by T.A. Zabrodina, graduate student [aspirant], Institute of Psychology, USSR Academy of Sciences]

[Abstract] A 'yes-no' approach was taken to the evaluation of the effects of mental tasks on visual stimuli (bar length and conceptual closure, and bar length and numerical series fill-in) in 17 to 27 year old males. In the first case the degree of difficulty of the conceptual closure task increased the success rate in differentiating bar lengths, whereas increasing complexity in identifying proper numbers had an adverse effect on such differentiation. In the former case the average time and degree of variation in problem solving decreased, and in the latter case increased. These observations indicate that mental tasks superimposed upon visual perceptive processes interfere with or influence the latter, in a manner that is dependent on the complexity and nature of presentation of the mental task. Figures 1; references 7 (Russian).

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#### VISUAL AUTOMATISMS IN HUMAN MEMORY

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 6, No 5, Sep-Oct 85  
(manuscript received 2 Apr 84) pp 32-40

[Article by B.M. Velichkovskiy, candidate of psychological sciences, Faculty of Psychology, Moscow State University]

[Abstract] A systems approach was employed in an analysis of the visual register of automatism in relation to long-term memory in humans, specifically its perceptive role in information processing and the consequences for subsequent encoding. Utilizing a variety of cultural and historical approaches to iconic memory or reading mechanisms demonstrated a complex of nonverbalized procedural knowledge which underlies visual cognition or automatism. These factors pretune semantic memory and set the degrees of freedom for conscious context analysis and interpretation. References 35: 20 Russian, 15 Western.

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## TWO PUTATIVE MECHANISMS OF SPEECH PERCEPTION

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 6, No 5, Sep-Oct 85  
(manuscript received 24 Aug 83) pp 52-61

[Article by V.I. Galunov, doctor of biological sciences, I.V. Koroleva, biologist and G.G. Shurgaya, science associate, Leningrad State University]

[Abstract] Dichotically-presented stimuli were employed in the case of 20 subjects to assess the function of the right and left cerebral hemispheres in speech perception, using syllables, words, and texts with and without noise interference. On the basis of the results, the left hemisphere was ascertained to be involved in segmental analysis and the right in pattern matching, with ear dominance reflecting the preferred processing mode. Consequently, two speech processing mechanisms act in parallel with each hemisphere possessing two successive blocks responsible for analysis and decision making, respectively. It is further postulated that in the processing of such signals information exchange can occur between the analogous blocks of the two hemispheres. In the majority of subjects the right ear predominated in the absence of noise, with inversion to the left ear in the presence of noise. In subjects with left ear dominance in the absence of noise, inversion of dominance did not occur on noise introduction. Figures 1; references 16: 6 Russian, 10 Western.

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## INDIVIDUAL FEATURES OF BODILY REACTION TO SOLAR HEAT

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 12, Dec 85  
(manuscript received 11 May 85) pp 40-44

[Article by L.Kh. Talanina, Z.R. Yunusov, V.I. Yakovenko and S.Kh. Farkhadi, Department of Physiology, Tashkent Order of Labor's Red Banner State Medical Institute]

[Abstract] To determine heat effects in hot climates, the authors studied, by methods of mathematical analysis, individual reactions in the blood circulatory system and its adaptations under burden, seeking to define possible types of vegetative reactions as a function of fundamental sympathetic or parasympathetic regulation. Subjects were 14 healthy males, 14-23 years of age, who were accustomed to life in a hot climate. They were subjected to 42-45°C at the end of June-July while all but their heads were exposed to the sun. Parameters considered were mathematical expectations and error, myocardial stress and amplitude, autocorrelation factors and shifts in the histogram. Results suggested some variations in heart rhythm with a slow, resting pulse, but the variations evened out

during exertion. No overheating of body temperature was recorded that could be traced to the sun's effects. Subjects with initial slow pulses showed sympatonic reactions, while those with more rapid initial pulses had bagotonic reactions. The shifts in cardiovascular activity, which did not represent evidence of excessive load, had a compensatory and adaptive character. Figures 2; references 11 (Russian).

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SPECTRA OF OPTICAL ABSORPTION SIGNALS OF NONVERTEBRATE ANIMAL NEURONS STAINED WITH POTENTIAL-SENSITIVE DYES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 6, Feb 86  
(manuscript received 11 Oct 85) pp 1512-1516

[Article by S.V. Yagodin, Institute of Physiology imeni I.P. Pavlov,  
USSR Academy of Sciences, Leningrad]

[Abstract] The technique of optical registration coupled with potential-sensitive dye staining makes it possible to register electric processes in individual nerve cells and their populations; it permits registration of electric processes in real time on live specimens. Potential sensitive dyes may have a monophasic or triphasic spectrum of absorbed optical signals, the first being characteristic of non-vertebrate and the second of vertebrate animals. The goal of this study was to verify universal application of this difference. The experiments were performed to show that the triphasic spectra obtained by the potential-sensitive probe WW375 are not characteristic of only the vertebrates. The presence of one of these two types of absorption spectra in neurons of nonvertebrate animals does not depend on the concentration of the dye, the time of staining, osmotic concentration, pH of the physiological solution nor the ionic balance; it is apparently a characteristic of a specific complex of membrane-potential sensitive dye. Figures 4; references 9 (Western).

7813/9835  
CSO: 1840/426

ATTITUDE OF POPULATION TO HEALTH SCREENING WORK OF RURAL OUTPATIENT AND POLY-CLINICAL INSTITUTIONS

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 12, Dec 85  
(manuscript received 9 Apr 85) pp 22-24

[Article by A.N. Khokhlov, I.I. Vvedenskaya and T.M. Duntsova from the Gorkiy Medical Institute imeni S.M. Kirov, Kameshkovsk Central Rayon Hospital of the Vladimir oblast, and the Borsk Central Rayon Hospital of the Gorkiy Oblast]

[Text] In many respects the effectiveness of health screening measures implemented depends on the quality of their organization and the preparedness of the population to seriously and consciously carry out physicians' recommendations for strengthening their health.

The physician-patient relationship during the course of health screening service must be evaluated by physicians in order to improve it.

A survey of the physicians and therapists of the rural hospitals and outpatient centers of the Gorkiy and Vladimir oblasts has made it possible to discover their opinion concerning the attitude of preventive care patients and the population toward their health and toward the health screening measures being taken to maintain it and to refine the ways of improving the quality of health screening service in the rural medical sector.

The results of the survey showed that the main reasons for patients' failure to carry out physicians instructions were a careless attitude of patients toward their health (74.3 percent) and a lack of understanding of the necessity of carrying out the physicians' recommendations. The physicians explained the low effectiveness of the health screening medical examination of patients with chronic diseases (60.7 percent) by these reasons. To a certain degree, a similar situation depends on the quality of hygiene education provided by medical personnel. Data from the survey confirm this: 78.4 percent of those surveyed noted the low effectiveness of the hygiene education service, and 5.4 percent indicated that hygiene education was not generally provided.

Thus, according to the opinion of the physicians, it is necessary to intensify work with preventive care patients and the population in the sector so that they will attain a favorable attitude toward health screening measures being implemented. On the other hand, physicians consider that the methods of hygiene education being conducted are not effective enough.



The physicians consider individual and group conversations at admission (74.6 percent), lectures for the population (31.3 percent), conversations in families (27.7 percent), and print leaflets (22.8 percent) the most effective forms of work with the population. In their opinion, a significant growth is noticeable in the role of the effect of social organizations on the lifestyle of persons living in rural areas where there is a more closed sphere of communication than in the cities. In addition, physicians feel that local councils of peoples' deputies (56.5 percent), party organizations (38.1 percent), trade unions (57.8 percent), komsomol organizations (13.1 percent), the Red Cross (6.5 percent), and home and street committees (2.6 percent) can have a definite effect on the quality of health screening services.

Conducting health screening examinations of the rural population requires larger expenditures of the labor of medical personnel than for the urban population because the former are particularly complex in their organization. At the same time, 44.8 percent of the physicians surveyed evaluate the examinations as being little effective. The physicians view an insufficient amount of time to conduct the examinations (patient load) (44 percent), the absence of necessary equipment for detecting diseases in the early stages (30.9 percent), insufficient activity of medical personnel when individuals refuse further examination and treatment when they feel well (13 percent), and poor organization of the examinations, etc., (5.8 percent) as the reasons for the lack of effectiveness of health screening examinations.

The majority of physicians feel that examining one person during the course of a health screening examination demands more time than admission to a polyclinic. Examining one worker who comes in contact with toxic factors in production requires significantly more time than before. According to preliminary computations, examining one person for purposes of health screening during a health screening examination takes 1.5 to 2 times as much time as examining one patient during admission to a polyclinic.

The results of the survey indicated that medical personnel understand the necessity of intensifying the hygiene education among the population and reinforcing individual work with patients and healthy persons by propaganda concerning a healthy lifestyle and hygiene training with a view to increasing the effectiveness of preventive care services, particularly in rural areas. At the same time, there are great difficulties in conducting these forms of service that are related to the lack of time of physicians at rural outpatient and polyclinical institutions as well as to the objectively existing difficulties in shaping a healthy lifestyle for the population in general and the rural population in particular. In the opinion of the physicians, solving these problems quickly requires increasing the role of social and government organizations in implementing preventive care measures and intensifying the interrelationship of physicians and social organizations in conducting health screening examinations.

All of the aforementioned confirms once again that the effectiveness of preventive care measures depends on the attitude of the population toward their health while carrying out the recommendations of a physician concerning work routine, rest, and lifestyle.

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DETECTION AND DIAGNOSIS OF PATIENTS USING MATHEMATICAL METHODS AND COMPUTERS  
UNDER RURAL HOSPITAL CONDITIONS

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 2, Feb 86  
(manuscript received 29 Jul 85) pp 28-30

[Article by D.F. Blagovidov, G.D. Vilyavin, I.P. Chulkov, V.A. Zelenskiy, M.A. Lerner, and V.F. Khvatova from the Surgery Institute imeni A.V. Vishnevskiy, USSR Academy of Medical Sciences and Yasnopolyana Hospital]

[Text] Since 1976 the Yasnopolyana Rural Hospital has used mathematical methods in its practical operation involving computers that were developed at the Surgery Institute imeni A.V. Vishnevskiy of the USSR Academy of Medical Sciences.

Simultaneous operation is being conducted in the following directions: active screening of individuals suffering from diseases of the abdominal organs and remote consultative diagnosis of patients with surgical diseases.

At the Surgery Institute a questionnaire method has been developed for the active screening of patients with diseases of the abdominal organs; this method is based on an anamnestic questionnaire consisting of 55 questions and 203 formalized answers to them. Formalizing the answers has made it possible to process them on a computer. When a specified number of answers characterizing a given syndrome are present, a computer unifies them according to a logical algorithm into syndromes, and the syndromes into a possible disease.

As a result of this processing, information is output that makes it possible to suspect diseases of the esophagus, stomach, duodenum, organs of the hepatopancreatoduodenal zone, and the large intestine and colon. When the questionnaire is processed, allowance is made for the degree of expression of the symptomatology that is sufficient grounds for establishing the sequence of calling patients to a physician, and the suspicion of a disease according to groups determines the methods used to examine a patient. It is known that the symptomatology of the specified diseases is rather diverse; however, such a path to correct diagnosis is probably optimal.

Besides the symptoms of the specified groups of diseases, the questionnaire contains an additional five questions for patients with hernias, varicosis of the lower extremities, and tumorlike formations having external localizations.

This operation differs in its organizational plan from the treatment and prophylactic operation that is traditionally conducted. At present the drain on medical personnel and the load on medical equipment are primarily determined by the turnover of the population. Conducting a questionnaire examination of patients has created a new principle in the interrelationships between treatment institutions and the population--admission of patients into a treatment institution is accomplished in accordance with their preliminary examination findings. As a result, an additional drain that has not been taken into account in regulating the load on medical personnel and the load on available diagnostic testing is placed on the medical service in the course of a specified period of time.

The questioning begins with the physician or nurse informing the individual undergoing the examination about the importance of the early detection of diseases and the technique of filling out the questionnaire. The medical personnel looks at all the questions on the questionnaire with the person being examined and explains them to him or her. They may fill out the questionnaire together, or the patient may fill it out at home and return it the following day. The information obtained from the questionnaire is then transferred to a punched carrier and input into a computer. The latter is processed according to a specified algorithm, and the questionnaire number, the last name, first name, and patronymic of the individuals filling out the questionnaire are output to a printer together with the specification of the assumed disease and the degree of its expression. In accordance with this, the person being examined is referred to a physician.

In 1984, 380 persons were surveyed at the Yasnaya Polyana sovkhos, after which 36.6 percent needed thorough examination. Of those examined further by a therapist, 18 percent did not have the diseases detected by the questionnaire (evidently, the questionnaires were filled out carelessly or incorrectly). Diseases of the gastrointestinal track were detected for the first time in 20.1 percent of those examined. It should be noted that among those individuals examined by a therapist, 54 percent belonged to the category of so-called "passive patients." They knew they had a disease but were not treated. Of the diseases detected, the most frequently encountered were chronic gastritis, duodenal ulcers, chronic cholecystitis, varicosis of the lower extremities, hernias, and tumors with various localizations. After examination, institutional treatment was administered to 22.8 percent of the patients, sanatorium-resort treatment to 15.8 percent, and outpatient treatment to 7 percent. Surgical intervention was recommended for 28.9 percent of the patients.

Examination of the specified patients required supplementary administration of 43 stomach roentgenoscopies and cholecystographies and 104 general and 50 biochemical blood analyses. These examinations made up 3 to 5 percent of the total number of diagnostic examinations conducted in the Yasnopolyana Hospital in the course of a year. The specified operation was conducted at the expense of internal reserves without bringing in any additional forces of medical personnel.

The results of the study showed that the questionnaire method is not perfect and has its faults. It cannot be said with certainty that all those individuals not falling into the category of ill were healthy; experience has shown

that the percentage of ill persons among them does not exceed 1 percent. The second direction of the operations was that of using the remote diagnosis system developed at the Surgery Institute imeni A.V. Vishnevskiy.

The system consists of medical, mathematical, and technical parts. The medical part of the system is a diagnostic map with a list of symptoms reflecting a given class of diseases and a medical memory characterizing the frequency with which a given symptom is encountered during a given disease. The mathematical part of the system consists of two algorithms: a probability algorithm represented by a Bayesian formula and the phase interval method. In addition, in the case of an unestablished diagnosis, the informational value of tests that have not been conducted is output. The technical part of the system is a computer with telegraph equipment connected to it through unionwide telegraph lines.

A similar system was created for a treatment institution where it is used to make differential diagnoses for purposes of refining a diagnosis. The system is used primarily with stomach diseases (17 forms) and acute abdominal diseases (20 forms) and more seldomly during the diagnosis of acquired valvular disease, tumors, and diseases of the female genital area. In the process a map that has been specially developed for a specific class of diseases is filled out, and its data are input to a computer along communication channels. After the data are processed, a diagnosis is output to the user on a teletype. The process of processing the information obtained and sending the results of the diagnosis takes 1 to 2 minutes.

By using such a system of consultative remote diagnosis, physicians at the hospital have refined their diagnoses of the diseases of more than 300 patients, including malignant neoplasms of the stomach in 17.5 percent, stomach and duodenal ulcers in 23.7 percent, chronic gastritis in 48.1 percent, acute appendicitis in 3.3 percent, acute cholecystitis in 4.0 percent, acute intestinal obstruction in 1.1 percent, acute pancreatitis in 1.0 percent, and diseases of the female genital area in 1.3 percent. The experience of the operation of the Yasnopolyana Hospital with the remote diagnosis system has shown that, above all, the very fact of the completion of the maps trains the physician, especially with insufficient clinical experience, and facilitates the more systematic collection of clinical data. The diagnosis of a specific patient that is obtained based on the consultative remote diagnosis system, especially when the hypotheses of the physician and the computer do not coincide, leads to a more thorough review of the clinical picture, which is beneficial for a more precise diagnosis. Also interesting is the fact that, in the process of working with the remote computer diagnosis system, the physician masters this diagnostic method rather quickly and refers to it in the future in all complex cases.

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## BACKWARDNESS, CORRUPTION IN TURKMEN MEDICINE

Moscow KOMSOMOLSKAYA PRAVDA in Russian 12 Dec 85 p 2

[Article by V. Ardayev, correspondent, Turkmen SSR: "When Medicine... Is Sick"]

[Text] Should something happen, the patient would not likely receive qualified medical assistance. And among medics, there are unfortunately those who are ready to use existing difficulties for their own selfish ends.

Each day of the trial dozens of people foregathered in the sessions room of the Ashkhabad Oblast Court. Two medical personnel were being tried--M. Kadyrov, a department chief of the oblast dermatovenereological dispensary and K. Koshuliyev, physician of the polyclinic's receiving department.

There was something to argue about, to become indignant about and something to learn. The medics are young. Meretgula Kadyrov is 29. Kakabbaya Koshuliyev is 26. It is only a year since Koshuliyev graduated from Turkmen State Medical Institute and received a physician's diploma.

Begin one's career in medicine with a bribe.... Tens of letters on this topic have been received at the editorial office this year. And there is a lot of mail on just about the same theme at the office of KOMSOMOLSKAYA PRAVDA correspondents in Ashkhabad. As you read it, you cannot help but reach the conclusion: an extremely unambiguous opinion on the state of their medical services has been formed among the residents of the southernmost republic of our country....

"When will order be established in health care?"--reader Avezov from Ashkhabad asks. "In order to have a tooth put in, you not only have to pay at the cashier's office but also the technician on the side. If you want to get into a hospital, don't dare approach the chief physician without a present. And at the hospital? Don't forget to hand a ruble to the nurse! And we pay, for health is dearer...."

Many agree with Ovezov. It is clear: machinations among medical personnel constitute a disease with which you cannot successfully deal everywhere. But is this all that the concern is about?

Three years ago the All-Union Conference on Prospects of Use of Domestic Inventions in laser surgery was held in Ashkhabad.

A success? Without a doubt. Many wonderful Turkmen scientist-medics, persons such as T. Tangrykuliyeu, work selflessly on the cutting edge of science.... But what is the situation on the "broad front" of medical services for the population?

The Republic Hospital for Invalids of the Great Patriotic War is located in the oblast center of Mary. In the bare stone court, there is no way to hide from the scorching rays of the hot Turkmen sun. The building is the usually "temporary" which has undergone in its time an unthinkable number of repair and reconstruction work. Complaints were made at the Komsomol gorkom: we shall bring here Pioneers to appear before the veterans--what lesson will they get? What example of respect for the achievement of the older generation will they see?

This is a medical institution which in its intention and in its calling should be the best of all. But how are the others?

Ashkhabad First Aid City Hospital. On the first floor of the extremely dilapidated building--the reanimation department, on the second--the surgical and therapeutic departments. Crowding, absence of elementary personal conveniences.

Exactly the same picture is to be found at Ashkhabad City Infectious Clinical Hospital.... The examples could be continued.

At the Turkmen SSR Council of Ministers they enumerated: the republic stomatological polyclinic has been in operation for 2 years. Only this year, the cardiological wing and the maternity division of the Republic Clinical Hospital imeni N.I. Pirogov, all with the latest equipment, the maternity home in Chardzhou, hospitals, polyclinics, pharmacies in oblast centers went into operation. One way or another work on strengthening the physical base of medical services for the republic's population is going on. But is it adequate?

Ya. Byashimov, a deputy chief of a department of the republic's Council of Ministers presents voluminous information:

"You see that the quotas of state capital investment for the construction of health-care facilities were utilized only 57.3 percent in four years of the five-year plan. If you were just to take the construction of hospitals and polyclinics, the figure would even be smaller; it is even worse with construction of children's and obstetric institutions.... Things have gone poorly this year, in 6 months, they managed to use slightly more than a third of all funds. So it is that since the beginning of the five-year plan, the republic's inhabitants have failed to receive from builders, on the whole, hospitals with a 1,180 bed capacity and polyclinics--with an outpatient capacity of 3,090. As a result, Turkmenia today lags significantly in the development of medical services.



This is where all the shortcomings stem from, and at other times, it is quite openly the disastrous state of many of the republic's medical institutions which has already been discussed. Normal medical services are more often than not in short supply. And where a shortage exists is an excellent field of opportunity for machinators of any hue. And bribery rejoices in the white smock of the physician...."

Actually, it is difficult to get to see a physician, it is difficult to receive quality treatment in a hospital.... Health and time are the most precious of all valuable things. A sick person loses hours in line waiting to be seen or a week or month to get into a hospital ward. It is more than he can stand. Especially when temptations exist to bypass the usual procedure with a payment, a present or a service. What is for all a shortcoming, is for the bribetaker a blessing. It gets worse and worse. This is how the extremes reached at the Ashkhabad Oblast Dermatology and Venereology Clinic come about.

The state of health protection of mothers and newborn is of special concern, and the construction of children's and obstetric institutions is in a bad way.

Turkmen builders have many problems. First of all, the weakness of their own base and a cadre shortage. These are well known, and they are sufficiently serious so that they are not referred to casually--this should rather be the subject of a separate discussion. Perhaps it would not have been worthwhile to touch on these problems in general were it not for one circumstance. In the past decade, Ashkhabad builders utilized tens of millions of rubles for installations such as a grandiose market--the Gulistan Trade Center built at the Square of a Hundred Fountains, the hippodrome.... There is no denying that the appearance of the Turkmen capital is being transformed. It is something to be proud of and to show to visiting guests.

Thus the "broad front" has lagged to a significant degree behind the "vanguard." But the undeveloped state of the material base is leaving an imprint on the condition of different sectors and different levels of medicine--even the most progressive. And then it turns out that the money--of which there is quite a bit!--allocated for their development is not bringing in the necessary return and that despite the outstanding achievements of leading scientists, the newest methods of treatment developed by them do not find worthy application.

Let us take that same laser surgery. The basic medical institution for its adoption and development has become the oblast hospital. But up to now the department of laser surgery has been a myth, a mirage, because it is located in two small rooms which with difficulty have accommodated the surgical laser Skalpel and Romashka units, the therapeutic laser (for healing postoperative wounds), acupuncture (for point massage). The contrast is striking--super modern equipment in old, crowded, unsuitable quarters fit to be torn down.

Laser surgeons receive dozens of letters from all parts of the country. On learning of successful operations, people turn to them for help. But how should they be answered? To even find a place for dozens of patients is a problem....

Now imagine: Turkmenia today has about 40 laser units. (For purposes of information: the least expensive--Skalper--is priced at 28,000 rubles. And many simply stand unconnected or even unpacked.

It's a pity about the people's money, but it's even more a pity about the people--both those people who cannot obtain skilled medical assistance and those whose knowledge, energy, strength and talent spent on advancing Turkmen medicine are shelved in the expectation of the completion of the next "Dolgostroy."

"The construction of a whole series of medical facilities is planned in the course of fulfillment of the decree of the CPSU Central Committee and the USSR Council of Ministers on measures for the further development in 1985-1990 of city services of the city of Ashkhabad," says Deputy Chairman of the Turkmen SSR Council of Ministers R.A. Bazarova. "But to overcome the lag, we need help as quickly as possible, first of all from union ministries whose enterprises are located on the territory of the republic--the USSR Ministry of Gas Industry, the USSR Ministry of Petroleum Industry, the USSR Ministry of Chemical Industry, the USSR Ministry of the Maritime Fleet and the Ministry for Production of Mineral Fertilizers.

Yes, the situation is such that medicine in Turkmenia needs to be improved through common efforts. Its ailment is weakness, neglect and backwardness of the material base. And on such fertile soil more serious diseases grow.

7697

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## BRIEFS

DOCTOR CONVICTED FOR WRITING FAKE NOTES--I. Pronin, a doctor from Shyrbarkuduk Station in Aktyubinskiy Oblast "sanctioned" 120 days of unauthorized absence from work with sick-leave notes. This cost the government almost 1,200 rubles. The first "fake note" was issued after an assistant mechanic, Z. Taskarin, mentioned to I. Pronin that his wife, a worker at a bus terminal, could guarantee free travel to Aktyubinsk. In return for such a "favor", the doctor three times issued fake sick-leave notes. In accordance with the notorious maxim, "You scratch my back, and I'll scratch yours," a second deal took place. For an illegal 11-day vacation, a mechanic, N. Atraubaev, provided Pronin with goods in short supply. This was only the beginning, with the stroke of a pen on a form, our Aesculapius pocketed 45 rubles for writing sick-leave notes for two workers who had received injuries while drunk. . . . I. Pronin was sentenced to four years imprisonment in a maximum security correctional-labor colony. [By A. Maslennikov] [Text] [Frunze SOVETSKAYA KIRGIZIYA in Russian 9 Jan 86 p 4] 12793

COMPUTERS AID PHYSICIANS--Deputy Minister of the USSR Ministry of Public Health Yu. Isakov reported to the editorial board that V. Sakhovskiy's article "A Physician's Reliable Ally" (Pravda, 6 December, 1985) touched on urgent issues concerning the creation of an automatic control system using computer technology. A commission from the USSR Ministry of Health acquainted themselves with the experience of the work of the city clinical hospital imeni S. P. Botkin in which a computer had been successfully used which allowed the expeditious making of decisions concerning diagnoses and treatment of critically ill patients, a decrease in the amount of time physicians waste on medical documents and statistical paperwork, and also the efficient use of the hospital's in-patient fund. It should be noted that an automatic control system using computers is also used in several other hospitals. At present the All-Union Scientific Research Institute of Social Hygiene and Public Health Organization imeni N. A. Semashko has been assigned by the USSR Ministry of Health to summarize the experience in the use of computers in the country's hospitals, following which this question will be reviewed by a board from the ministry for the introduction of more promising "hospital automatic control systems" in large hospitals. [Text] [Moscow PRAVDA in Russian 22 Feb 86 p 2] 12793

CSO: 1840/432-A

## FIVE-YEAR PLAN FOR HEALTH IN SIBERIA

Moscow SOVETSKAYA ROSSIYA in Russian 11 Mar 86 p 2

[Interview with N.V. Vasilyev, academician of the USSR Academy of Medical Sciences by A. Smirnykh, Tomsk; date not given]

[Text] For every man as well as for society, there is no greater treasure than health was noted at the 27th congress of the Communist Party of the Soviet Union (KPSS); The preservation and improvement of people's health is a problem of primary importance. This is especially important in Siberia - a country characterized by harsh climate and lack of settlement. The opening up of Siberia and the Far East will not be complete and sufficiently effective unless the number of newcomers includes a medical man. This subject was discussed in the interview with N.V. Vasilyev, academician USSR AMS by our reporter.

[Question] Nikolay Vladimirovich, your department of microbiology of the Tomsk medical institute is involved in the study of the relationship between the formation of immunity and the adaptation process. Isn't it very hard for man to adapt to more severe conditions of nature?

[Answer] We have the same kinds of protection against frost as against heat. These possibilities greatly depend on our attitude - do we love our job, are we interested in the country where we have arrived, are there favorable living and working conditions. For example, I myself came from Yalta; I had spent my childhood in Voronezh; I consider Tomsk my native place. I have become completely adapted.

[Question] According to statistics, the population density of western Siberia is lower than that of the central regions of the country by a factor of eleven, and that of eastern Siberia is even lower. What will influence the population of the territories east of the Urals?

[Answer] The problems of migration and adaptation are nine tenths not medical nor are they climatic, although our winter is really exhausting: in the central belt of Russia, it is shorter and milder. The problems are due to social and living conditions. It is very important how towns and settlements are built. In his time, Zavenyagin, director of the Norilsk metallurgical combine, a clever statesman, failed to deal with temporary

temporary structures, barracks. The modern Norilsk--this jewel of the Soviet North, "little Leningrad"--is an example how a modern socialist town should be built under polar conditions.

I am far from idealizing what already has been done in Taimyr. They have their own problems, and these problems are not insignificant. However, at present, on the line of the half-century existence of Norilsk, it can be absolutely proven, on the example of this town, that a steady population can be created under very severe climatic and geographic conditions.

I want to tell you my opinion about the "Vakhta" [shift] method. I have not opposed it in principle. Shift crews are now necessary, and in certain regions, it is the only solution. Without shift crews we could not acquire the resources of the northern land. However, according to my firm conviction, the prospects of economic and cultural development consist in the formation of a rather numerous, steady contingent of population feeling themselves to be owners of this land.

Yes, in the first stage of development, the "Vakhta" method is an inevitable process, and we cannot do without it. But are we interested in it? The romantic tent dwelling idea is somewhere popular, the tendency to invest little, but gain much, sometimes takes the upper hand. But the crew is a "watch" crew, a take-off situation, and it is impossible to work all the time in a take-off process.

[Question] Does it mean that for a man in Siberia, it is safer to settle down for a long time, basically better in both the private and public project?

[Answer] True. Unfortunately, in recent years, the history of the conquest of the North gives negative examples. At present, steps have been taken to correct the situation of town planning in the towns and settlements of northern Tyumen Oblast. However, usually it is always harder to correct something than to do it correctly right from the beginning. I would like to emphasize again and again that from the point of view of social hygiene, economizing in the social and cultural living conditions in the regions with extreme climatic conditions is absolutely inadmissible, and in the long run it affects detrimentally the human potential of these regions. The benefit there is imaginary, don't believe in it.

At present, Tyumen Oblast is throwing thousands of workers into its "Vakhta" settlements by airplane from the southern and western regions of the European part of the country within a few weeks. This is certainly also expensive and gives rise to a lot of serious, not only economic, but also medical problems. Thus, the problem of organizing the health care of shift crews has not been finally solved. They work as an expeditionary force, whose native home is thousands of kilometers from work. As far as I know, this problem is now in the process of solution to a greater extent, spontaneously, on the initiative order by the crew members themselves.

These are the complications of the "Vakhta" methods, the extensive spread of which poses great problems for modern medicine. These have been thought

to be solved especially by the medical scientists of Siberia. The problem is not simple; it requires a special, complex work.

[Question] Nikolay Vladimirovich came here to you on the Uchebnaya street with prospects. On the sides, stand snow-covered old houses with wings, balconies, spacious windows in wooden lace pattern. To create such a beauty, perfect physical and moral health is needed. The Siberians apparently do have it.

[Answer] Of health, one cannot speak in monosyllables. In the mass colonization of Siberia, the czarist government kept it under control, hastened it by migrating; the death rate of the population was colossal. But those who survived to an age of eighty years were fishermen and hunters. Such are the contrasts there. Why has not Siberia become deserted--you are asking. A peasant's family with 10 and 12 children is considered usual. But some of the children died in childhood from infectious diseases. However...Now, everything has changed. The man born and raised in Siberia or emigrated there must have sturdy health.

You have noted by the way, that today, Saturday morning, when there is not even dawn on the Tomsk streets, you met the first skier. This is the sign of our town. Possibly, somebody or other says good day to you. Tomsk is located in the South of Siberia. There you have a taste of the polar circle. I come back again to the example of Norilsk. In a polar night, going on skis is really reckless, on the other hand, although swimming pools are better, they cannot be found in Norilsk. But as soon as the sun appears on the horizon, the crowd of Norilsk inhabitants take to their skis. Consider that man's health depends on how one of us takes care of himself or herself and also on the care by physicians, of course, on the initiative of the party, soviet economic leaders. Would Norilsk have attained its first "Five-Year Plan" and fulfilled it successfully if it did not have the same initiative?

Multi-year experiences in the opening up of new regions have convinced us that a physically and morally developed man is able to execute very serious, next-to-extreme work loads without risk of exhaustion. Preparation is, of course, necessary. And, therefore, I want to emphasize especially that preparation has to be made from young age on, while still at school; the family has to be given the prerequisites to form a strong, sturdy character.

It is thought that the currently conducted school reform has to be regarded not only in the light of education but also in the light of social sanitary approaches. The development, the population of the sparsely populated territories of Siberia, the polar regions, are facing us, our children and grandchildren. It follows from this that the protection and development of the health of the hard workers of Siberia, the polar regions, is a great government task. Its solution needs joint efforts of many departments; it goes far beyond the scope of medical problems. The health of man, his attitude and ability to work, greatly depend on a complex of social, cultural, everyday-living conditions.

[Question] What is going done by the scientists of Siberia, especially in your institute with regard to the problem of health care and its control?

[Answer] The Siberian Department of the Academy of Medical Sciences of USSR has set forth large-scale programs. They are already being carried out. Thus, in Norilsk, the scientific and practical program, the "Five-Year Health Plan" is being fulfilled. The complex "Vakhta" program is intended to solve a number of problems connected with safe working methods. The divisions of the Tomsk institute of the USSR AMS and the Tomsk Medical Institute have set forth a program for the preservation and improvement of the health of Tomsk gas and oil miners. For example, in Tomsk, on the initiative of Academician Rostislav Sergeyevich Karpov, a floating dispensary was put into operation. This ship is equipped with modern, medical apparatus with a team of great specialists-cardiologists on board. In the first trip, last year, during two months, many hundreds of inhabitants of the Tomsk territories were examined. The initiative of Tomsk physicians has been accepted by Tyumen physicians.

A great number of works are being conducted also by the department of microbiology of the Tomsk Medical Institute headed by me. For example, a collective work and a speech involving the safety features of our organization have been prepared.

[Question] Which of the unsolved health care problems seems to be the most urgent in your organization?

[Answer] There is such a problem indeed. The number of physicians for Yakutia, Krasnoyarskiy Kray and certain regions of Siberia is established according to the measure used for the European part of the Soviet Union. Without taking into consideration the population density, the presence of transportation routes. It is totally wrong. How much are we trying to prove - in vain!

Without man, the resources of Siberia cannot be completely opened up, nor developed. To complete the famous Lomonosov slogan - "Russian might will expand Russia" -, I would say: make Siberia great by man and his good health!

12999/9835  
CSO: 1840/1117

## MEDICAL GEOGRAPHY AND DISSEMINATION OF DISEASE

Riga SOVETSKAYA LATVIA in Russian 28 Jan 86 p 4

[Article by Aleksey Dmitriyev]

[Abstract] Medical geography has long consisted primarily of the study of the reasons for the spread of various diseases in isolated areas. Medical geologists now undertake much broader tasks, including predictions of how various combinations of environmental factors will influence human health, how people will adapt to natural conditions in areas newly being assimilated and how the design of new cities and factories should be altered to consider the medical geography of the area in which they are to be constructed. Among the most important tools used by medical geographers are special maps showing environmental parameters significant for human health. Such maps were recently used to make the decision not to construct a permanent city at the Yamburg gas deposit, but rather to bring workers in for brief periods and construct the city nearby, where health-related environmental conditions were much better.

6508/9835

CSO: 1840/355

## SIMPLE RULES FOR A HEALTHY LIFE

Moscow VECHERNAYA MOSKVA in Russian 27 Feb 86 p 3

[Article by B. Yakovlev]

[Abstract] One of the simple physiological truths that Kh.Kh. Irgashev attempts to impress on his students is to lead a moderate existence without alcohol and smoking. Irgashev, head of the Chair of Normal Physiology at the Samarkand Medical Institute, has made a study of the life habits and nutrition of aged residents in Uzbekistan. His advice has been sought by many and he gladly shares his observations with his colleagues. His findings have been implemented at many of the local agricultural and industrial collectives with good results. The advice is always the same: simplicity in nutrition with heavy reliance on herbal teas supplemented with milk and honey, with reliance on medications only when necessary.

12172/9835

CSO: 1840/1094

## EXPERIENCE WITH CONSTRUCTION OF LARGE MEDICAL COMPLEX IN TRANSURALS

Moscow NA STROYKAKH ROSSII in Russian No 2, Feb 86 pp 32-35

[Article by Ye. Rozenbaum, chief, "Kurgant'yazhstroy" PSMO [expansion unknown], USSR Ministry of Heavy Construction, RSFSR Honored Construction Engineer, and V. Kalmykov, engineer]

[Abstract] At a cost of 19.1 million rubles construction has been completed on the Kurgan Scientific Research Institute of Experimental Clinical Orthopedics and Traumatology. It is the only institution of its kind in the world, including a 360 bed clinical department and extensive facilities for research and rehabilitation. The core building is a 7-story structure from which radiate three 5-story buildings. Detailed description is provided of the grounds, location of the physical plants, and of the clinical and other buildings, including residential facilities. A key factor in the successful and timely completion of the project was socialist competition among the worker and engineering brigades, and the high degree of cooperation and coordination among the ministries and industrial enterprises engaged in this project. Figures 4.

12172/9835

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UDC 613.954

## SOCIOHYGIENIC CHARACTERISTICS OF FAMILIES WITH SMALL CHILDREN

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 1, Jan 86  
(manuscript received 4 Apr 85) pp 5-7

[Article by R.A. Zakirov, Chair of Social Hygiene and Organization of Public Health, Central Asian Medical Pediatric Institute]

[Abstract] A questionnaire study was conducted on 300 families with children in the first year of life, in order to plan appropriate pediatric care in Tashkent. The analysis revealed that 60.3% of the families had 4 members (excluding the older generation), 39.6% had 5 or more members, and 3.3% were single-parent (mother) families. In terms of the number of children per family, the data showed the following: 30.5% of the families had one child, 29.7% had two children, 14.4% had three children and 25.1% had four or more children. In 70.1% of the families the parents had essentially equivalent education, while in 15.7% the educational level of the father was higher than that of the mother, and in 14.2% the reverse was true. Breast feeding was the norm for 41.1% of the mothers with higher education, and 58.8% of those with intermediate education. The average mother was married at the age of  $21.2 \pm 0.1$  years, with the age difference between husband and wife not exceeding 3 years in 60.1% of the marriages. The data also revealed that 62.4% of the mothers adhered to regularly scheduled

pediatric polyclinic visits, and 37.2% adhered to recommendations for physical exercises and massage for children. Such information is obviously of inestimable value in planning for pediatric health care, as it indicated accomplishments and identified areas needing improvement.

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# FIRST-YEAR HEALTH STATUS OF CHILDREN FOLLOWING UNCOMPLICATED AND COMPLICATED PREGNANCIES

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 1, Jan 86  
(manuscript received 9 Apr 84) pp 26-28

[Article by A.K. Kasymov, docent, Chair of Neonatology, Tashkent Order of the Red Banner of Labor Institute for the Advanced Training of Physicians]

[Abstract] An assessment was conducted on nonspecific immunity factors (NIF) during the first year of life of 104 children born of uncomplicated pregnancies, and 152 born to mothers with complications (anemia, nephropathy, ABO and Rh incompatibility). NIF (complement, properdin, lysozyme levels, phagocytic activity, monocyte counts) were depressed in the latter group of children 5.9-times as often as in children born of uncomplicated pregnancies. In addition, developmental lag was noted 6.4-times as frequently in children resulting from complicated pregnancies, and their disease incidence during the first year of life was 1.1-fold greater (2.2-fold in the first 3 months). These observations substantiate the fact that complications of pregnancy have a deleterious effect on the adaptive potential of neonates and subsequent extrauterine clinical course.

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# MOTOR ACTIVITY AND HEALTH OF PRESCHOOLERS IN SUMMER

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 1, Jan 86  
(manuscript received 10 Dec 84) pp 28-30

[Article by T.A. Levchenko, Chair of Hygiene of Children and Adolescents, Tashkent Order of the Red Banner of Labor State Medical Institute]

[Abstract] An analysis was conducted on the relationship between motor activity of 4-6 year olds in Tashkent kindergartens, and their state of



clinical health in the summertime. The data for the 150 subjects, boys and girls, showed two peak times of motor activity--1000 and 1800 hours--and that the hours of actual physical (motor) activity per day were inversely related to age. Thus, 4 year olds showed active motor activity for 6 h/day, and the 6 year olds for 4.5 h/day. Medical examinations demonstrated a positive correlation between good health and motor activity, indicating that measures need be taken in kindergartens to ensure a higher level of physical activity. Figures 1; references 3 (Russian).

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UDC 618.3-055.28

# COURSE OF PREGNANCY AND DELIVERY AND FETAL AND NEONATAL STATUS IN RELATION TO MULTIPAROUS HISTORY

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 1, Jan 86  
(manuscript received 14 Sep 83) pp 32-35

[Article by M.Kh. Khamidov, Chair of Obstetrics and Gynecology, Pediatrics Faculty, Samarkand Order of People's Friendship State Medical Institute imeni I.P. Pavlov]

[Abstract] A statistical study was conducted on 2191 multiparas to ascertain the effects of number of births on the course of pregnancy and delivery, and the status of fetuses and neonates. The cohort included cotton growers, women living in cotton-growing areas but not engaged in cotton growing, and a control group of women from animal husbandry farms. The women ranged in age from 19 to 35 years, with mean ages of  $24.7 \pm 0.08$ ,  $26.4 \pm 0.14$  and  $26.3 \pm 0.36$  years for the three groups. Incidence of various complications increased with the 5th child, indicating that women in that category should be considered a high-risk group. In addition, women engaged in cotton growing or residing in such areas also presented with an increase in incidence of complications in comparison with women living in areas devoted to animal husbandry. The average birthweight and incidence of early neonatal complications were, respectively, significantly lower and higher in the cotton growing group than in women merely residing in the area or elsewhere. These observations indicate that special pre- and postnatal care should be accorded to women in cotton growing areas to prevent complications during pregnancy and postpartum sequelae.

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TASKS OF ALL-UNION AND REPUBLIC SCIENTIFIC MEDICAL SOCIETIES IN PUBLICIZING  
ACHIEVEMENTS OF MEDICAL SCIENCE AND COLLABORATION IN THEIR IMPLEMENTATION  
IN PRACTICAL HEALTH CARE

Moscow KLINICHESKAYA MEDITSINA in Russian No 6, Jun 85  
(manuscript received 11 Mar 85) pp 8-12

[Article by V.A. Nasonova, Moscow]

[Abstract] All-Union scientific medical societies (AUSMS) and their republic counterparts (RSMS) total some 520 associations, whose leadership includes many academicians and corresponding members of the USSR Academy of Sciences and Academy of Medical Sciences, as well as other leading medical scholars. Their role in improving the general level of Soviet health care is the subject of the present article. Special areas of research include computer tomography, dopplerography, treatment of extrapyramide ailments, use of hemosorption, hyperbaric oxygenation and gravitational blood surgery, artificial vaccines, microsurgical reconstruction of hands and fingers and treatment of nerve trauma. The AUSMS and RSMS also support and cooperate with city and regional scientific societies, chiefly to improve practical elements of health care. These societies have the additional goal of attracting as many physicians as possible into societies. Despite much success, certain shortcomings in the work of these societies are noted in the article. Medical researchers, gerontologists and geriatric specialists, specialists in rheumatism and immunology, medical historians, anatomic pathologists and pharmacologists have not organized into all-Russian societies. Many aspects of the work of medical research societies continue to be poorly organized, and they fail to put new developments into medical practice, or devote sufficient time to young scientists.

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IMPROVING HOSPITAL MEDICAL CARE

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 12, Dec 85  
(manuscript received 18 Mar 85) pp 5-9

[Article by M.Kh. Kamalov, Bashkir ASSR, Minister of Health and  
M.Ye. Petrov, doctor of medical sciences]

[Abstract] Hospital facility development in the Bashkir ASSR is surveyed, showing numbers and specialization of health care. General and specialized beds in the republic total 13,700 in 56 hospitals, including a children's hospital with 550 beds and a cancer hospital with 650 (called the largest in the country). The relationships between clinics and

hospitals and post-confinement health care are also discussed. Special facilities for physical therapy and other convalescence, particularly in the villages, have enabled the republic's health services to reduce the amount of time lost in rehabilitation to an average of 24 days (in comparison with rehabilitation in clinics). One difficulty faced by the proponents of this approach to convalescence is the reluctance of authorities to issue temporary work release permits. A network of village general hospitals with 8,600 beds has also been established. These hospitals place special emphasis on surgery, midwifery, gynecology and pediatrics. Early diagnosis has helped to reduce serious heart ailments as early forms of cardiovascular disease are diagnosed and treated. Reconstruction and maintenance of physical facilities have also received special attention.

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#### EFFECTIVENESS OF HOSPITAL BED UTILIZATION

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 12, Dec 85  
(manuscript received 17 Jan 85) pp 22-26

[Article by M.P. Roytman, All-Union Scientific Research Institute for Social Hygiene and Organization of Public Health imeni N.A. Semashko, USSR Ministry of Health, Moscow]

[Abstract] Among tasks of intensifying the Soviet economy, an important role is given to improving the efficiency of health care. The present article reports on utilization of available hospital beds. The author cites WHO figures to show that Soviet hospital bed numbers have reached the European average, while in annual days of use, the USSR is leading those countries. The basis of this high use is in improved health care quality and more rational use of the material, personnel and financial foundations of hospitals. Planning, in particular the methods proposed by V.N. Shcherbakov, call for assessment of bed use for each separate facility, development of a coefficient of extensive use in order to determine the number of beds that may be needed, and deeper analysis involving a network of hospitals to establish comprehensive bed need for the potential patient numbers. Average length of hospital stay, repair and preparation time and patient turnover time are all considered in the calculations. Where the number of unused days approaches zero, the need for new facilities emerges. Only consideration of the overall set of parameters can, however, make such a clear determination. References 13 (Russian).

12131/9835  
CSO: 1840/1112

## TWO-LEVEL AUTOMATED SYSTEM OF ECONOMIC PLANNING FOR REPUBLIC HEALTH CARE

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 12, Dec 85  
(manuscript received 29 Mar 85) pp 27-31

[Article by L.N. Kirik, Yu.A. Mikhnenko, G.I. Kortushin and L.V. Rozinka,  
UkSSR Ministry of Health, Republic Information and Computer Center,  
UkSSR Ministry of Health, Kiev]

[Abstract] High material, technological and personnel levels in health care owe a great deal to mathematical economic planning using computers. In the UkSSR, much of this progress has resulted from the implementation of the subsystem known as "Planfin", or "Planning and Financing of Health Care Institutions". This planning system has received organizational support, improved information systems and close adherence to technological instructions; together these aspects have contributed to the successful automation described in the present article. The authors discuss inter-related planning at federal, republic and regional levels which contribute to rational specialization guidance at outpatient clinics, regular clinics and hospitals. The computer center uses the ES-1022 computer to plan the overall network of hospitals and clinics, staffing needs and salaries, operating expenses and needs for capital equipment. The standard for clinics is one of general clinic per 1,000 inhabitants. The computer system is also used for records of health care provided and for analysis of the financial condition of health care operations in general. Various sub-systems, such as medical statistics, bookkeeping, personnel, capital construction, are also maintained in the data processing system. Introduction of "Iskra-226" minicomputers will increase the capability of the system. References 4 (Russian).

12131/9835  
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## DEMOGRAPHIC AND PROFESSIONAL CHARACTERISTICS OF PHYSICIANS ATTENDING INSTITUTES FOR ADVANCED TRAINING OF PHYSICIANS

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 12, Dec 85  
(manuscript received 9 Apr 85) pp 32-35

[Article by A.B. Khmyrov, N.A. Bederova and G.V. Losev, Leningrad  
Institute for the Advanced Training of Physicians imeni S.M. Kirov]

[Abstract] The question of post-doctoral studies for Soviet physicians has, according to the authors, always been of major concern. They studied medical statistics of demographic and professional characteristics

of 10,000 physicians, with 52.9% from the RSFSR, 34.5% from the UkSSR, 4.7% from Central Asia, 3.6% from the Baltic republics, 1.7% from Moldavia, 1.4% from Byelorussia and 1.2% from the Transcaucasus. More than half were from the capitals of their republics, 37.4% were men, and most were from 30-49 years of age. Statistics indicated that many physicians undertook post-doctoral studies before completing the internship and 3 years work experience guidelines expected by Soviet practice. Village uchastok hospital doctors and those from central rayon hospitals were less likely than city physicians to undertake additional studies. Only 290 of the total were engaged in emergency medical services (skoraya pomoshch). Also, 76.9% of those in post-doctoral studies were already specialists, 16.2% were administrators, and 6.9% were engaged in teaching. About half were engaged in their first post-doctoral study program.

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CSO: 1840/1112

#### MAJOR PUBLIC HEALTH PROBLEMS OF KIRGIZIA UNRESOLVED

Frunze SOVETSKAYA KIRGIZIYA in Russian 11 Feb 86 p 3

[Article by Yu. Grebennikov, special studies group leader, Kirghiz SSR Ministry of Health]

[Abstract] Despite considerable advances in the diagnosis and treatment of various diseases and the establishment of new hospitals and medical research facilities, much of the morbidity has the appearance of an iceberg. In other words, the problem that is addressed is merely the tip of the iceberg, while the major portion of the public health problem remains unrecognized or, worse, neglected. The latter is intimately related to preventive medicine and includes the variety of socio-psychoeconomic factors that predispose to disease: urbanization, job stress, working conditions, and the increasing intensity of every-day living conditions. Such factors account for a large part of the increase in morbidity ascribed to cardiovascular, mental and gastrointestinal problems. The underlying causes cannot be rectified by simply building more hospitals and clinics, but by instituting fundamental changes in the working and living environment. Unfortunately, until this problem is specifically addressed, no further improvement in the health status of the population of Kirgizia can be anticipated. The indications that this problem will be addressed seem remote. The various industrial enterprises and establishments seem bent on ignoring health regulations for the sake of productivity, while the judicial authorities entrusted with enforcing such regulations appear to have more important things to do than be concerned with health matters.

12172/9835  
CSO: 1840/1119

## PROBLEMS WITH PEDIATRIC CARE IN UZBEK SSR

Tashkent PRAVDA VOSTOKA in Russian 15 Feb 86 p 3

[Article by M. Khaidarov, sanitation physician, supernumerary inspector of the Dzhizak City Committee of National Control, O. Dydochkin, lathe operator, Dzhizak Oblast Soviet deputy, member of the Permanent Health Commission, and V. Berezovskiy, Pravda Vostoka correspondent, Dzhizak Oblast]

[Abstract] Pediatric care in the city of Dzhizak and in the Dzhizak Oblast is in a disastrous state, with many parents preferring to take their children elsewhere for medical attention. The various hospitals and clinics are in a state of disrepair, the facilities are unheated more often than not, the equipment and supplies are third rate and there are shortages, and the meals are deficient in nutritional value. It appears that, perhaps, someone is making a profit from all these 'economies'. Be that as it may, try as hard as they might the pediatricians are left to their own devices and apparently can't get any cooperation from the building and construction enterprises in keeping up and expanding the existing facilities. Plans for the construction of new facilities exist on paper, of course, and that's where they have been for years without any actual movement. Is it any wonder that it is hard to keep qualified medical personnel in Dzhizak and that many of them have simply lost the motivation to excel? In the final analysis, it is the children that continue to suffer the consequences of poor medical service.

12172/9835

CSO: 1840/1116

## IMPORTANCE OF POSTGRADUATE MEDICINE

Tbilisi ZARYA VOSTOKA in Russian 12 Jan 86 p 3

[Article by Vakhtang Akhalaya, based on interview with Semen Khechinashvili, rector, academician of the USSR Academy of Medical Sciences, Lenin Prize laureate, Saul Kakhiani, prorector, Aleksey Sikharulidze, prorector, and Georgiy Tsanova, chief, Chair of Anesthesiology and Resuscitation, Tbilisi Institute for the Advanced Training of Physicians]

[Abstract] The Tbilisi Institute for the Advanced Training of Physicians is one of the oldest education institutions of its kind in the USSR, and presently provides training to over 3000 physicians per year, more than 70% of them from Georgia. In order to provide the latest in information and practice to its students, the faculty of the Institute is actively engaged in both clinical and basic research on a variety of medically-relevant

problems, and themselves undergo advanced training in Moscow at the Central Institute for the Advanced Training of Physicians. In addition, the Institute maintains close contacts with many other research institutes and often invites guest faculty for special lectures. Contact is also maintained with colleagues abroad, and in many cases conferences are arranged to provide for further stimulation of the intellectual environment.

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## PSYCHIATRY

### SELECTED PRINCIPLES UNDERLYING ORGANIZATION OF CLINICAL PSYCHOLOGY SERVICES

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 6, No 3, May-Jun 85  
pp 111-116

[Article by M.M. Kabanov, director, Leningrad Psychoneurological Scientific Research Institute imeni V.M. Bekhterev]

[Abstract] Clinical psychology has now gained wide recognition in the USSR, and is generally defined as dealing with mental factors affecting disease and the effects of somatic disorders on the mental status, and with the relationship between patients and their (micro)-environment. One important aspect of clinical psychology concentrated on full rehabilitation in the fullest sense of the term, encompassing return to work capacity as well as coming to terms with the reality of disease and its effects on everyone. Although clinical psychology services are now available at many medical institutes and hospitals, usually in conjunction with psychiatric clinics, further development of clinical psychology as a medical specialty is hindered by several considerations. One of the latter is that the status of the clinical psychologist remains unclarified in the public health system, with the USSR Ministry of Health having failed to define appropriate professional standards. Another difficulty is presented by the lack of coordination of such services with the other medical services. Finally, no clear educational programs have been established to monitor performance and provide opportunities for postgraduate training. References 4 (Russian).

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STUDY OF SOCIAL AND PSYCHOLOGICAL ASPECTS OF HEALTH SCREENING EXAMINATIONS OF POPULATION

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 12, Dec 85  
(manuscript received 10 Sep 85) pp 10-12

[Article by V.I. Dmitriyev, A.V. Nikolskiy, and V.P. Ruban, Moscow]

[Text] The transition to mass health screening examinations is a complex and prolonged process. The development and refinement of the forms and methods of organizing and conducting health screening examinations in order to provide the high level and good quality of this measure is one of the tasks in the first stage (conducting annual health screening examinations of the entire population).

A lot of experience in preventive medical care and in conducting mass health screening examinations has been accumulated in our country. Thus, in the RSFSR, health screening examinations are conducted on approximately 86 million persons or 61.4 percent of the total population. A significant number of essentially healthy contingents of the population are under systematic medical observation. They include children and adolescents, workers in a number of industries and professions, pregnant women, athletes, and donors (in all approximately 70 million persons). A total of 26.7 million persons are registered and observed by physicians in connection with chronic diseases, and annual examination and treatment is provided to 33 million inhabitants of the Russian Federation in institutions [7].

The subdivision of therapeutic and pediatric sections that has been made in our country, the Policy Statement Concerning the Department for the Health Screening Unit of the Urban Polyclinic (1981), and the strengthening of the material base of outpatient and polyclinical institutions have created the organizational prerequisites to attain the preparatory period and the first stage in the mass health screening examination of the population.

There are many works dealing with the transition to mass health screening examination of the population that reflect the organizational problems [1, 3, 4, 8] and the participation of the population in conducting the health screening examinations [2, 5]. No attention has been paid to the social and psychological aspects, which are significant in improving the forms and methods of

the organization and implementation of these measures. This is because, in the majority of cases, so-called obligatory contingents, i.e., those needing verification of the state of their health to enter an educational institution or travel to a sanatorium, as well preventive care patients who believe in preventive medicine and want to be socially active, have submitted to health screening examinations.

However, there is another category of patients who do not wish to go to a physician [6, 10], especially among "healthy" contingents. This may be explained by the fact that at present neither patients nor physicians yet understand the important promise that the preventive care direction in medicine holds. In the opinion of a number of authors, some doctors still do not understand the meaning and purpose of health screening activity, considering it a prerogative activity of specialized institutions with a specific profile [9, 10].

The reasons for the negative attitudes toward health screening examinations on the part of the population and medical personnel have not been studied sufficiently. The social and psychological aspects of implementing health screening examinations were studied in this context.

The study was conducted on the basis of interviews of medical personnel using a standardized questionnaire (41 questions) and a survey of the population. The study of the opinion of medical personnel concerning the structure and function of the subdivisions of the polyclinic or preventive care department directly implementing health screening examinations and about the participation of other public health institutions and leading specialists revealed that medical personnel are fulfilling their functions in the organization and implementation of health screening examinations, using the Policy Statement Concerning the Department for the Health Screening Unit of an Urban Polyclinic as a guide. However, in a number of institutions, the physicians and middle medical personnel were still conducting medical examinations of the population as before according to previously established traditions.

Among other things, the interviewing provided for obtaining answers to the following questions: How or in what manner are the functions of each office of the preventive care department being conducted? and what needs to be done to improve the activity of the preventive care departments? The results of the survey uncovered more than 60 organizational and approximately 50 social and psychological problems. For example, 26 organizational and 23 social and psychological problems confronted the offices of health screening examinations of the preventive care departments when accomplishing their tasks as a complete body. Among other things, the surveying of the population for purposes of detecting individuals with risk factors, which was introduced in the office of health screening examinations, has met with resistance on the part of all physicians. This is evidently explained by the increase in the load and time expenditures, the incompetence in collecting social information, difficulties in processing the data obtained, and a number of other factors.

It should be noted that approximately 50 percent of physicians working in preventive care departments or physicians directly making the health screening examinations do not perceive direction and assistance from leading specialists who by and large are hospital personnel. When evaluating their social role,

approximately 70 percent of the specified physicians noted they feel they are constantly "pleading" because of their limited possibilities in conducting laboratory and functional research and in consulting specialists. In their opinion, this is because other physicians and often administrators of institutions do not sufficiently understand the importance of preventive care and health screening examination. The majority of physicians complained about the increase in load that in their opinion results in haste in their work and that reduces the quality of conducting preventive examinations.

The responses of the population to an anonymous questionnaire agreed with the data on the physicians' questionnaire. The questionnaire included questions relative to how informed the population is concerning health screening examinations and their evaluation of the organization of implementing these measures, as well as their quality and results. Among those members of the population surveyed were individuals who have undergone health screening examinations and individuals who haven't. The surveying took place in the first half of the year.

It was determined that only 5.1 percent of those surveyed did not know about the annual health screening examinations of the population. Among the remaining portion of those surveyed, the main sources of knowledge about the necessity of health screening examinations were medical personnel in 40.1 percent of cases and mass information (print, radio, television) in 21.2 percent of the cases. In addition, in the opinion of the population, the information about the expediency of conducting health screening examinations is insufficient (75.1 percent of the respondents noted that they wanted more detailed information concerning them). Evidently, this is one of the reasons for the negative attitude toward participating in health screening examinations. This circumstance is also confirmed by the fact that among those who have not undergone health screening examinations, 38.5 percent have a negative view of them, whereas only 23 percent of those who have undergone a health screening examination have a negative view of them.

Being informed as to the expediency and necessity of conducting annual health screening examinations turned out to be a positive influence on the attitude of the population toward participating in them. It was determined that 17.0 percent of those asked the reason for their negative attitudes toward participating in health screening examinations indicated their uselessness, 10.6 percent their lack of faith in medical personnel, and 12.8 percent their fear of finding out about a life-threatening disease. The majority of those who felt that health screening examinations are useless were between 20 and 29 years old, and most of those lacking faith in medical personnel were aged 30 to 39. It should be noted that 25 percent of those individuals with a negative attitude toward health screening examinations specified long lines in offices that, in their opinion, were related to insufficiently clear organization of these measures.

Of the total number of those undergoing health screening examinations, only 72 percent spoke about their organization positively; of these, 35.3 percent specified an inconvenient time for the examination, and 17.6 percent mentioned difficulty in obtaining consultations with physicians and specialists.

The long lines in offices and the haste with which the examinations are conducted lead the population to have the impression of a careless, inattentive attitude toward them. In addition, information about the results of the examinations and recommendations of the physicians do not always satisfy those undergoing the examinations. Fifteen percent of those who have undergone examinations mentioned this.

It was determined that 33.5 percent of those surveyed did not receive any recommendations after an examination was conducted. These were mainly young persons. The number of those not receiving any recommendations decreased noticeably with the age of those being examined.

Of those given recommendations, 28.3 percent were designated for outpatient and polyclinical treatment, 21.0 percent for treatment in sanatoriums and preventoriums, 14.5 percent for exercise and sports activity, 10.9 percent for a change in lifestyle and to break harmful habits, 10.1 percent for hospital treatment, 5.9 percent for a change in working conditions, 5.7 percent for diet, and 3.6 percent for exercise therapy.

It should be noted that the physicians making these recommendations did not always take the real possibilities of their being implemented into account. Sometimes the recommendations were unconvincing. Thus, of those told to change their lifestyle, 77.8 percent did not follow the advice given, 75 percent did not start exercising or take up a sport, and 60.0 percent did not seek outpatient and polyclinical treatment, citing a number of objective and subjective reasons (busy at home or at work, long lines in the polyclinics, inconvenient reception time, involvement in self-treatment, etc.).

As is well known, the negative mood of individual persons may be transmitted to groups of people and may create a distorted view of the real state of matters. Considering that the number of those dissatisfied with the organization and implementation of health screening examinations is rather weighty, the necessity of thoroughly studying the social and psychological aspects of improving the methods of preparing and conducting health screening examinations of the population is evident. This will make it possible to improve the organization and quality of conducting health screening examinations and raising their value for medical personnel and patients.

Studying the social and psychological aspects of conducting medical examinations makes it possible to discover the general regularities and flaws and the particular problems of each individual treatment and health screening institution. The solution to the social and psychological problems of mass health screening examinations must be a complex process involving the administrations of the enterprises, organizations, and institutions, as well as mass information, society, and the population itself.

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ASYMMETRY IN FORMATION OF PERCEPTIVE AND PHANTOM IMAGES IN BINOCULAR  
VISION

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 6, No 3, May-Jun 85  
pp 74-85

[Article by V.V. Suvorova and M.A. Matrova, candidates of psychological  
sciences, Institute of General and Educational Psychology, USSR  
Academy of Pedagogical Sciences]

[Abstract] An analysis was conducted on the paired visual analyzer in  
relation to the function of the mono-ocular systems in the formation of  
a single binocular image, in order to define asymmetric parameters in the  
formation of perceptive and phantom images. The haploscopic studies  
demonstrated that identical visual information elicits functional  
differences in the right and left eye. The right eye was found to  
dominate in the formation of phantom images. This arrangement in the  
majority of the subjects--corresponding to the natural distribution of  
right- and left-handedness--presupposes a dominant role of the primary  
visual cortex (layer IV) of the left hemisphere in the fusion process leading  
to a single image. Figures 1; references 32: 24 Russian, 8 Western.

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EXPERIMENTAL STUDIES ON FORMATION OF VISUAL PERCEPTION

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 6, No 3, May-Jun 85  
pp 14-21

[Article by M.P. Nikitin]

[Abstract] A reprint of Nikitin's work on the formation of visual  
perception, originally published in 1905 in Vestnik Psikhologii,  
Kriminalnoy Antropologii i Gipnotizma [Journal of Psychology, Criminal  
Anthropology and Hypnotism] illustrates an original approach to analysis  
of the steps involved in visual perception. The analytical approach was  
based on an analogy to the formation of a photographic image, in which  
images are formed slowly depending on the exposure time. Similarly,  
subjects were presented with selected images via a tachiscope and asked to

reproduce them in drawings. The degree and fidelity of reproduction were analyzed in relation to a number of parameters, including the effects of presentation of other objects on the perception of the target object. Nikitin reached the conclusion that the formulation of a 'hypothesis' or a 'concept' of the object significantly affected the perceptual process. This phenomenon, Nikitin felt, transformed a general impression of the object into a series of transformations resulting in more and more differentiated perception. In this respect Nikitin antedated later studies in Germany on 'aktualgenesis' and in the USA and other European countries on 'microgenesis'. Figures 4; references 5: 1 Russian, 4 Western.

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## VETERINARY MEDICINE

### TRANSPLANTATION OF SUPERIOR BOVINE EMBRYOS TO SURROGATE COWS

Yerevan KOMMUNIST in Russian 2 Feb 86 p 2

[Article by V. Alaverdyan]

[Abstract] Workers at the Burastan State Farm are now utilizing the method of embryo transplantation to achieve radical herd improvements at dairy farms in extremely short periods of time. The method involves selection from a herd of the most productive cows, followed by hormonal stimulation of a group of donors to result in the development of multiple embryos. A catheter is then used to wash out the embryos, and the viable ones are transplanted to recipient "incubator" cows for birth. The new method has been used to produce six calves and this year the number is to increase to twenty.

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### ANTIVIRAL VACCINE FOR CONTAGIOUS ECTHYMA IN SHEEP

Frunze SOVETSKAYA KIRGIZIYA in Russian 3 Jan 86 p 2

[Article by Yu. Blyum, correspondent]

[Abstract] The Institute of Biochemistry and Physiology, Kirgiz SSR Academy of Sciences, has organized production of a vaccine against contagious ecthyma in sheep, minimizing the time elapsed between scientific development and mass production of the vaccine. The new vaccine can be administered to newborn animals rather than waiting until they reach 4 months of age, as was previously required with earlier vaccines. The problem of rapid production of commercial quantities of the vaccine was solved with the full cooperation of the Institute which developed it. In cooperation with all-institutes producing veterinary preparations and experimental veterinary institutes, the technology of production is being improved. A laboratory is preparing for mass



production of vaccines against viral abortion in sheep, immunoglobulins against paratyphoid in sheep and diarrhea in cattle. The Scientific-Production Laboratory has obligated itself to produce one-half million doses of vaccine above the planned level by the opening of the 27th Party Congress.

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## CONFERENCES

### CONFERENCE ON HEALTH PROBLEMS

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 6, No 3, May-Jun 85  
pp 157-158

[Article by G.I. Popova]

[Abstract] A conference on the "Socio-economic Problems of Human Health" was held in Lvov; it was organized jointly by the USSR Academy of Sciences, the scientific institutes of the Western Ukrainian Scientific Center of the Ukrainian SSR Academy of Sciences, and the Lvov Oblast Committee of the CP of the Ukrainian SSR. The conference concentrated on socioeconomic, philosophical and psychological problems affecting the health of the Soviet people. The conference was opened by the second secretary of the Lvov Oblast Party Committee V.A. Svyatotskiy, who familiarized the participants with the development of the public health services in the Lvov region, and by O.K. Gavrilov, academician of the USSR Academy of Medical Sciences, who delivered a talk on "Politics of the CPSU with Respect to Public Health within the Scope of an Advanced Socialist Civilization". Although many of the talks dealt specifically with Western Ukraine, the problems of the entire Soviet Union were well covered by the many speakers. The conference ended with a call for intensification of research efforts in public health and assessment of the effects of technological and scientific progress, and for emphasis on a holistic approach to such problems.

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## MISCELLANEOUS

### FIRE INSPECTION AT COTTON PLANT

Moscow LENINSKOYE ZNAMYE in Russian 4 Jan 86 p 3

[Article by M. Rogozhnikov]

[Abstract] A fire-inspection team visited the Glukhovskiy Cotton Combine, which had been officially shut down for fire safety violations, on 18 Dec 1985. A bad situation existed there. The plant was still operating, fire safety violations still in place, even after the fires in recent years and numerous additional minor blazes, in spite of being officially shut down by the fire safety brigade. The situation involved solvents stored next to flammable cotton and paper, an inoperative sprinkler system, and a manager who complained that he was not warned of the "surprise" inspection. The situation is not improving.

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### FROM DATA BANK TO BANK OF KNOWLEDGE

Moscow KHIMIYA I ZHIZN in Russian No 2, Feb 86 pp 24-28

[Article by E. Velina, special correspondent]

[Abstract] The problem of storage of and search for scientific information is very real: every decade the number of scientific publications doubles, in some active areas this occurs as often as every five years. The storage capacity of a data bank is virtually unlimited. The advantage of a data bank is that information may be stored in many ways and retrieved in as many ways. Creation of automated indices was but the first step towards data banks. The next step from the data banks is development of data bases. According to this author, creation of data bases faces unsurmounted problems as of now. The author expressed serious doubts about the ability to unite data banks into data bases; the success achieved in the West was related to profits obtained from selling data bases. Creation of data bases is the most important task of the scientists working in biology and in programming.

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